MAY, 1949 Vol. 38, No. 5

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

REQUISITION NUMBER

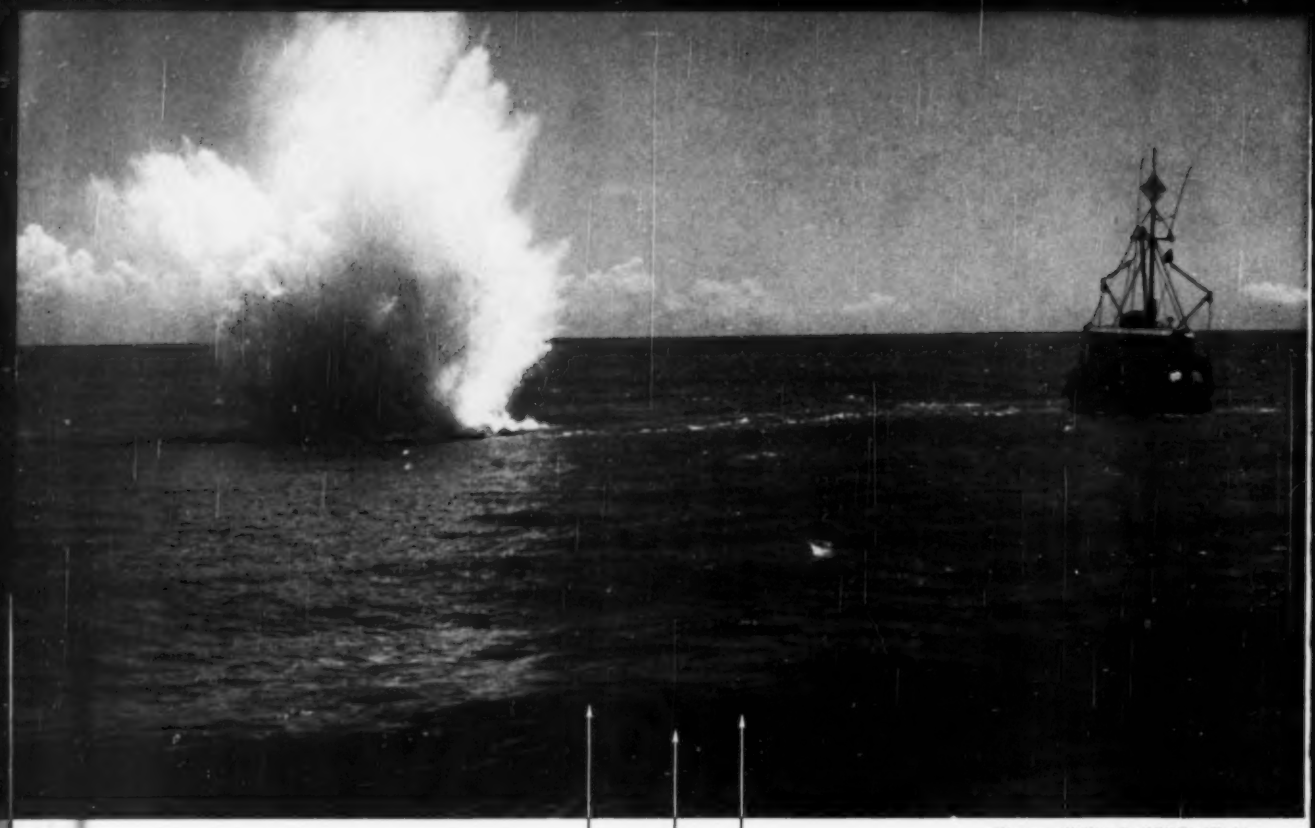

Photo credit Standard Oil Co. (N. J.)
Photo by Russell Lee.

Riches . . . *where you'd least expect them*

LOOKING OUT across the gray and green wash of waters along the coast of the Gulf of Mexico, you would hardly expect to find under those waters incalculable stores of petroleum. Yet seismograph explorers and drillers miles offshore are mapping salt domes that may yield up some of the richest oil deposits in history.

Similarly unpromising in outward aspect are many of the youngsters that throng our classrooms today. Yet wealth not just of the obvious sort but of incalculable value lies hidden there, its discovery awaiting only the use of the right exploratory and development techniques.

And here is the *true* responsibility of the *true* educator . . . to go prospecting among these outwardly unpromising lads . . . to stir the fire of ambition that slumbers in each, to resolve the internal conflicts that inhibit and frustrate so many of them, to discover the unique personality values and talents that are the possession of all.

Instructors in mechanical drafting know the value of right inspiration, right introduction, right auspices when such lads first come to their classes. Wise mechanical drafting instructors never make the mistake of belittling anything about this important work. They will never say it doesn't matter *what* drafting instruments these boys use, nor that they can be carelessly chosen. They *know* the exact contrary is true and they make it their business to see each lad has the finest drawing instrument set it is possible to buy him. Here lies the true role and the true achievement of the true educator . . . the initiation and the shaping of those influences not found in the curriculum which are the very essence of the true educational process.

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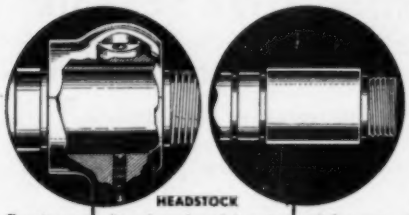
EVERYTHING FOR DRAFTING AND SURVEYING

SOUTH BEND 9" LATHES



HEADSTOCK

Bearings are line bored and bearingized for precision fit. Ample lubrication from oil reservoirs. Spindle is carburized, hardened, and ground; with bearing sufaces super-finished to .000005" rms.

BELT RELEASE

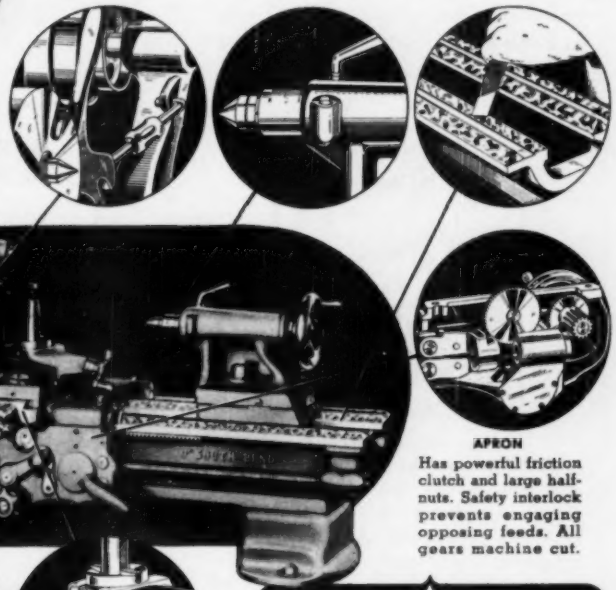
Instant release of belt tension for speed changes. Proper tension of headstock spindle drive belt is easily adjusted.

TAILSTOCK

Has set-over for taper turning. Graduated spindle has witness mark for aligning cutter bit. Hardened center self-ejecting.

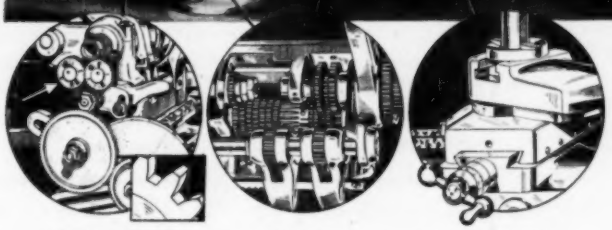
BED

Three V-ways and one flat-way are hand-scraped entire length for precision alignment of headstock, tailstock, and carriage.



APRON

Has powerful friction clutch and large half-nuts. Safety interlock prevents engaging opposing feeds. All gears machine cut.



REVERSE GEARS

Easily shifted for reversing lead screw rotation and feeds, positive lock. All the gears used in this lathe are machine cut.

GEAR BOX

Screw threads and power feeds selected by shifting two tumblers as indicated on index chart. All gears machine cut steel.

CARRIAGE

V-ways and dovetails hand-scraped. Engine divided micrometer collars on feed screws. Compound Rest base graduated 180 degrees.

Specifications . . .

South Bend 9" Model A Lathe

SWING	over bed — 9-1/4"
	over cross slide — 5"
BED LENGTHS	3, 3-1/2, 4, and 4-1/2 feet
DISTANCE BETWEEN CENTERS	16" to 34"
SPINDLE SPEEDS (12)	41 to 1270 r.p.m.
POWER FEEDS:	
Longitudinal (48)	.0015" to .0853"
Cross-feed (48)	.0004" to .0252"
THREADS (48 pitches)	4 to 224 per inch
MAXIMUM COLLET CAPACITY	1/2 inch
SPINDLE BORE	3/4 inch
TAILSTOCK TOP SET-OVER	5/8 inch

SOUTH BEND LATHE WORKS

466 East Madison Street, South Bend 22, Indiana, U. S. A.

Please send catalog(s) checked:

- ☐ Catalog No. 9 — all models of South Bend 9" Lathes.
- ☐ Catalog No. 100 — all sizes of South Bend Lathes.
- ☐ Catalog No. 400 — South Bend Precision Drill Presses.
- ☐ Catalog No. 500 — 7" Bench Shaper.
- ☐ Catalog No. 77 — Attachments and Accessories.

NAME _____

STREET _____

CITY _____ STATE _____

9" x 3' Model A Bench Lathe, illustrated (Cat. No. 644-Y), with 12-speed horizontal drive, motor, and control — less bench . . **$335.45***

Other South Bend 9" Precision Lathes range in price from $192.45* to $796.45*; depending on model, length of bed, mounting, type of motor drive equipment, etc.

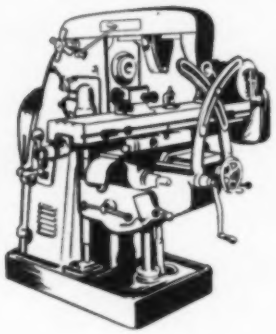
*Prices, f.o.b. factory, include 3 phase, 60 cy., 220-V., motor and control.

SOUTH BEND LATHE WORKS

BUILDING BETTER TOOLS SINCE 1906

An Unusual Opportunity

For School Shops to Secure Desirable Machine Tools in Exchange for Less Needed Ones



Perhaps you, like many other schools and universities, have received since the war surplus machine tools not well suited to your needs. A number of institutions have found an answer to this problem by *exchanging* this equipment for new, used or rebuilt tools which exactly meet their shop requirements. In most cases this has been accomplished without any cash outlay.

Indianapolis Machinery & Supply Company has a large stock of new and completely guaranteed late model used and rebuilt machine tools, ideal for school shop use. For full details of the exchange plan, send us a complete description of the equipment you would like to trade.

Indianapolis Machinery & Supply Co.

1964 South Meridian Street

INDIANAPOLIS 6, INDIANA

Calling All Rural High Schools

A New Text in "Applied" Math for Students Interested in Agriculture

. . . Just off the Press . . .

RURAL ARITHMETIC

By Orville L. Young, Ph.D.
Division of Agricultural Education
Illinois State Normal University
Normal, Illinois

Here is the kind of course that meets the real life needs of those students who, either before or after graduation, decide to remain on the farm. It is a new publication written by a specialist in agriculture, one who knows the actual situations arising on farms and the way famers approach these situations.

Following a complete review of fundamental operations are nine chapters containing general information and practical problems arranged in areas such as farm crops, live stock and poultry, soils, buildings, fertilizers, and fencing.

The problems in each chapter are up-to-date and include many processes. This presents a life-like situation, making the student select the right process and giving him practice in all fundamental operations. They also teach him about correct methods of farming since they compare the results of right and wrong ways of doing things.

The computations are limited to those ordinarily used on farms. The text is profusely illustrated. $1.96

Write today for an examination copy. We will gladly send you one without obligation for 30 days' study.

THE BRUCE PUBLISHING CO.
705 Montgomery Bldg. Milwaukee 1, Wis.

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, May, 1949, Volume 38, No. 5. Published monthly, except July and August, by The Bruce Publishing Co., 540 N. Milwaukee St., Milwaukee 1, Wis. Entered as Second-Class Matter January 2, 1914, at the Post Office at Milwaukee 1, Wis., under the act of March 3, 1879. Subscription price in the U. S., Canada, and countries of the Pan-American Union, $3.00 per year; Foreign, $3.50; Single copies, 35 cents.

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FRANKLIN *Liquid Hide* GLUE

Solves Every Glue Problem for Schools

THE CASE OF THE MISSING MINUTES

Classes can't wait. When glue must be mixed and heated, it takes time from them. But not when you work with Franklin, ready to use at all times. It's liquid, needs no heating or mixing. Yet it's the same quality, genuine hide glue as that requiring mixing and heating. You can use the best hide glue now without waste of time or glue. Unused portions are poured back in the can. You teach with hide glue that is always the same qaulity from day to day—no spoilage.

Good joints require proper preparation. If faces fit tight, joint should be stronger than the wood itself . . . that's an important lesson for young craftsmen to learn. Teaching with Franklin liquid hide glue gets this point across.

GOODBYE "STINKY POT"

You'll discover there is no odor to Franklin. And with the passing of the glue pot goes the fire hazard from keeping glue hot. Applying quickly to avoid chilled joints is also eliminated when the glue pot is no longer

needed. Franklin is practically foolproof. Makes joints stronger than the wood itself. Our control laboratory assures 100% wood failure for every properly-made wood joint with Franklin glue . . . always the same high quality.

Franklin glue does not stain wood. It spreads thin, makes almost invisible joints. Easy on tools, too. Franklin never gets hard or brittle, so joints can be planed and worked over without dulling tools. Because it spreads farther, requires no heating and eliminates waste, Franklin is more economical than ordinary glues.

BETTER TRAINED FOR INDUSTRY

The same quality Franklin liquid hide glue furnished in small containers to you is used by leading furniture manufacturers. Your students will know how to use it efficiently when they exchange school days for pay days if you use it in classes. It's the only glue available in less than 55-gallon drums that is used generally by large woodworking concerns.

Available in **6 SIZES**

Tubes, ¼-pints, ½-pints, pints, quarts and gallons. If your school supply company or hardware dealer cannot supply you, write directly to us.

Industrial Arts Teachers Recommend Franklin Glue:

"I am indeed sold on Franklin Glue as the glue to be used in woodworking shops and have found it to be the most satisfactory we have tried in our school shop." WASHINGTON

*

"I have used your cold glue in the adult education woodworking class at the high school and consider it to be excellent . . . I think that the man who invented cold glue that sticks is a benefactor of mankind in general and of amateur craftsmen in particular." KANSAS

*

"We have used nothing but Franklin Glue in our schools for more than eight years and will not accept any other now. It is the ideal for classroom work because of its quality and foolproof application." OHIO

*

"We are in the wholesale school supply business and one of our lines is manual arts equipment, your glue has been recommended to us as a fine glue to sell to schools." MICHIGAN

*

"I have received this glue and I have tried it to my satisfaction. I must say here that it is the best and easiest glue to use and it shows the break less than any glue I have ever used." TEXAS

Above are excerpts from letters in our files. Names and addresses will be furnished on request.

FREE SAMPLE

Write on your school stationery.

THE FRANKLIN GLUE COMPANY, Columbus 15, Ohio

NEW

11-inch SWING Logan LATHES

FOR THE SCHOOL SHOP

Designed and built for industrial use, these 11" Logan Lathes equip the school shop for a wide range of projects that keep student interest at a high level and provide a broad and thorough training.

They Have CAPACITY...

1" collet capacity, 1⅜" spindle hole, and center distances of 24" and 36" are indicative of the capacity for larger work these 11" swing lathes offer.

They're ACCURATE...

Precision preloaded ball bearing mounting assures sustained accuracy at any spindle speed from 45 to 1500 rpm. The two V-ways and two flat ways of their rugged beds are precision ground to a tolerance of .0005" along the lineal capacity of the lathe.

They're SAFE...

To protect inexperienced student operators, the countershaft, back gears, headstock, change gears and motor drive belts of these 11" lathes are all completely enclosed, yet easily accessible.

They're DURABLE...

Self-lubricating bronze bearings protect against wear at points where bearings are not ordinarily used. The lathes are ruggedly built throughout to withstand the stresses of school shop use with a minimum of maintenance.

They're A SOUND INVESTMENT...

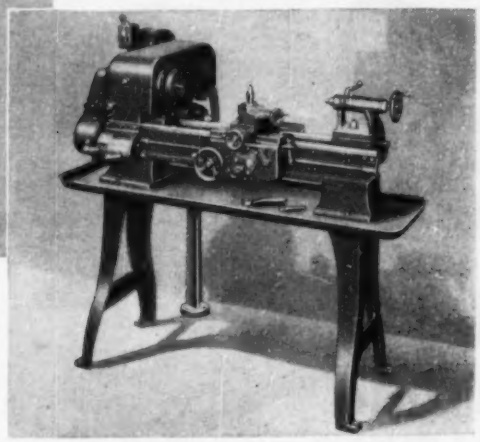
We know of no other lathe which offers the student and the school so much in accuracy and versatility for the price that Logan production efficiency makes possible.

WRITE FOR DETAILED INFORMATION ON ALL LOGAN 9", 10", and 11" LATHES AND 8" SHAPERS

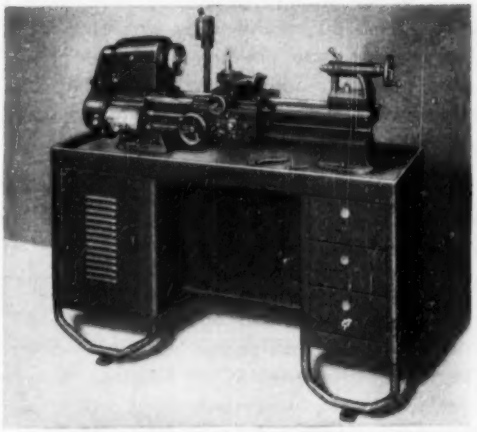
LOGAN ENGINEERING COMPANY

4901 WEST LAWRENCE AVENUE • CHICAGO 30, ILLINOIS

Available in Bench, Floor, Cabinet and Turret Models



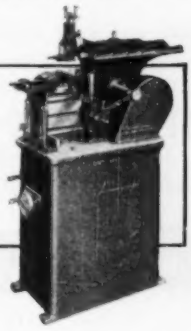
Logan 11" Floor Lathe. Quick Change Gears, 1" Collet Capacity, 1⅜" Spindle Hole, 24" and 36" Between Centers



Logan 11" Cabinet Lathe. Quick Change Gears, 1" Collet Capacity, 1⅜" Spindle Hole, 24" and 36" Between Centers

LOGAN 8" SHAPER

Combines extra capacity, wide speed range, smooth power and simple, low cost operation.



LOOK TO Logan FOR *BETTER* LATHES AND SHAPERS

ROUND OUT YOUR SCHOOL SHOP PROGRAM

AT LOW COST!

Atlas

MILLING MACHINE

Your educational program can take on a broader, more purposeful scope with an Atlas miller in your shop. Milling is such an important part of modern industrial production that each student should be thoroughly familiar with milling fundamentals.

There is no better tool for such instruction than the Atlas. It is an industrial quality tool — priced within school budgets.

The Atlas performs the entire range of milling jobs with ease and accuracy. It has 8 spindle speeds, back-geared power, V-belt drive, Timken Tapered Roller Bearings. Conserves space — measures only 25½" x 32½" x 22" overall. Operates from ½ HP, 1725 RPM motor.

Modernize your school shop with this economy-priced milling machine. Write for catalog.

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MATCHED PRECISION TOOLS FOR METALWORKING AND WOODWORKING

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Hi-Speed No. 120

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$145.50 F.O.B. FACTORY

Put new efficiency into your older Johnson Furnaces.

Write for details on factory re-building.

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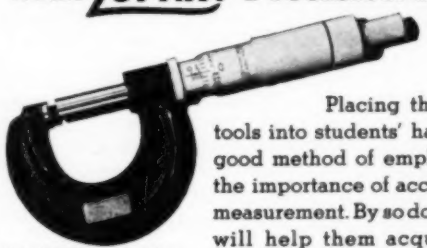
Stress the importance of

TRUTH IN DIMENSIONS

with LUFKIN Precision Tools



MICROMETER NO. 1941
Heavy, enameled, ribbed frame micrometer especially designed for students' use. Rust resistant "CHROME CLAD" non-glare satin finish on hub and spindle makes markings stand out in bright or poor light.

Placing these fine tools into students' hands is a good method of emphasizing the importance of accuracy of measurement. By so doing, you will help them acquire the same confidence which the name "Lufkin" has inspired in the minds of skilled craftsmen for more than sixty-five years. Write for free catalog.

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PRECISION TOOLS · TAPES · RULES
Saginaw, Michigan

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Costs less to BUY...and Costs less to MAINTAIN

$298.50

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Here's a really versatile combination set-up to meet all needs for shop training in both *wet* and *dry* honing. Best of all, it's the only honing machine that can handle all sizes within its range with *only one honing head* . . . And you'll find your stone replacement cost at least 50% less. Model 1600 Coolant Unit is portable and can be used with other machines in your shop. Mail the coupon below to get full information on the economical AMMCO honing combination. We'll also send you the name of your nearest AMMCO distributor who will be glad to arrange a demonstration in your shop at no charge or obligation.

Perfect for School Shops... the AMMCO 7" SHAPER

A "precision machine of a thousand uses" . . . regular industrial model, featuring simplicity of operation, ease of set-up, precision results. Check coupon for complete details.

AMMCO

AMMCO TOOLS, INC., 2100 Commonwealth Avenue, North Chicago, Ill.

- ☐ Send information on Combination 2600-1600
- ☐ Send information on AMMCO 7" Shaper
- ☐ Send free copy of the AMMCO Tool Catalog

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Standard for Industry

SINCE 1899

What is more logical than to demonstrate and teach soldering with Kester Flux-Core Solders, the product that the student will be using in later years? Have him become familiar now with Kester's fine flux-core solders to better equip him to cope with intricate soldering problems in industry.

Free Technical Manual

Send for Kester's new 28-page manual, "SOLDER and Soldering Technique" . . . a complete analysis of the application and properties of soft solder alloys and soldering fluxes.

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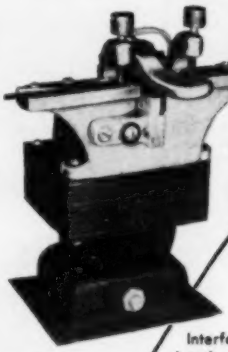

ERWOOD
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BAND SAW
BRAZER

BRAZES BLADES UP TO ½" WIDE IN ONE OPERATION AND UP TO 1" WIDE IN TWO OPERATIONS

Complete with brazer, 6 ft. cord, plug, brazing material and fluxes. Shipping weight, 11 lbs.

ONLY $19.75

Interference in class work due to broken band saw blades is eliminated with an Erwood Band Saw Brazer. It does the same repair work as brazers which cost nearly four times as much. The Erwood quickly pays for itself in less "down-time" on machines. It also permits additional savings resulting from making your own band saws from coil stock. It permits use of projects involving inside contour sawing.

The Erwood Brazer consists of high current transformer with two resistance electrodes arranged in clamping device. Built for 110 volt, 50-60 cycle operation or 220 volt, 50-60 cycle operation. Light in weight, it can be moved to any convenient position.

GUARANTEED TO GIVE COMPLETE SATISFACTION

See your dealer or write

The ERWOOD Company

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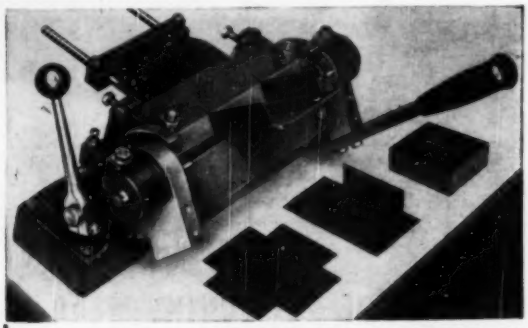

A BOX FORMING PROJECT
with DI-ACRO BRAKE and DI-ACRO NOTCHER

Here is an interesting and practical student training project which teaches ingenuity in forming methods with modern equipment. Step I. The four corners of the flat material are notched with the DI-ACRO Notcher (not illustrated). Step II. Two sides of the box are formed with the DI-ACRO Brake as shown. Step III. The top forming bar on the brake is slotted to allow the previously formed sides to enter, while last two sides are formed.

Send for **40 PAGE CATALOG** describing "Die-Less Duplicating" with all six DI-ACRO Precision machines — Benders, Brakes, Shears, Rod Parters, Notchers, Punches — and showing many examples of duplicated parts.

DI-ACRO PRECISION MACHINES DIE-LESS DUPLICATING

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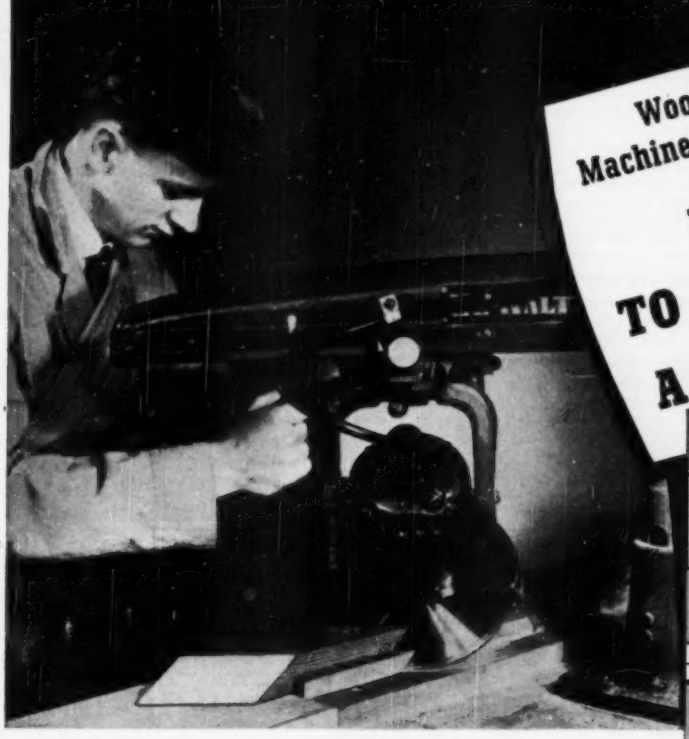
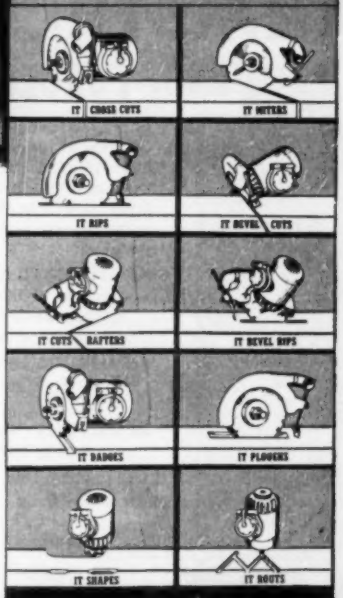
Make this a required course . . . and your wood-shop training is complete!



Wood Shop Machine Course No. 1

HOW TO OPERATE A DE WALT

DE WALT is a complete shop in itself



...and with proper tools makes any cut possible!

After the student has completed his basic training course in the use of hand tools, he should have a required course in the operation of DeWalt.

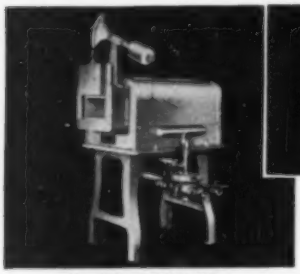
Knowing how to make the fullest use of this flexible, easy-to-operate machine, will give any student a head-start as he prepares for tomorrow's industry.

When he leaves school he will be fully acquainted with a machine that is destined to occupy a prominent place in tomorrow's industry. The perfection of the DeWalt saw has created new methods in cutting wood, making obsolete old-style equipment previously used.

Ask a nearby DeWalt dealer about two DeWalt 16MM movies—one showing the general application of DeWalt—the other showing modern, pre-cutting techniques developed during the war. Write for catalog.

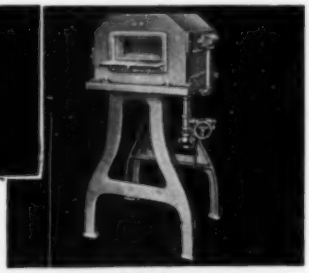
DE WALT, INC.

75 Fountain Avenue Lancaster, Penna.



Small Semi-Muffle Oven

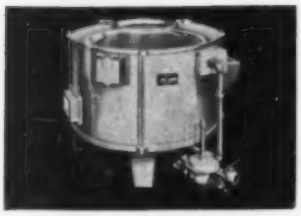
Sunbeam
STEWART
THE BEST INDUSTRIAL FURNACES MADE



Small Forge

HUNDREDS OF THESE SUNBEAM STEWART FURNACES ARE IN THE VOCATIONAL DEPARTMENTS OF TECHNICAL SCHOOLS

Because Sunbeam Stewart units have been designed for efficient production heat treating in small shops and tool rooms, they are widely recognized as standard equipment for all types of industrial heat treating and vocational training work. For student instruction and reference write for our free "Guide to Furnace Selection." Aids in determining the type of furnace best suited for any work. Also ask for the new Data File on school units.



Round Pot Furnace

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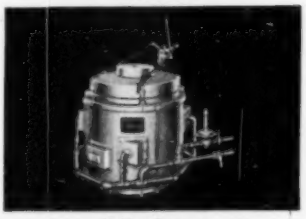

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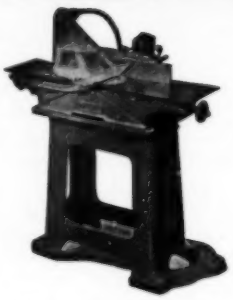

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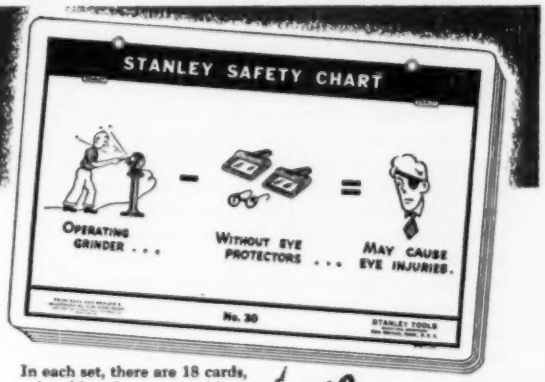

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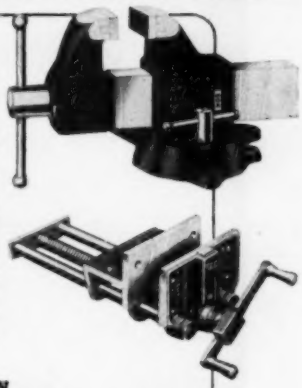

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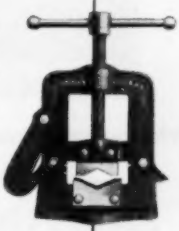

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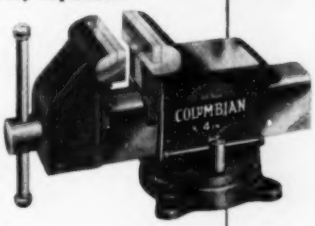

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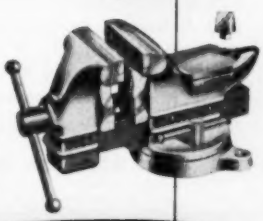

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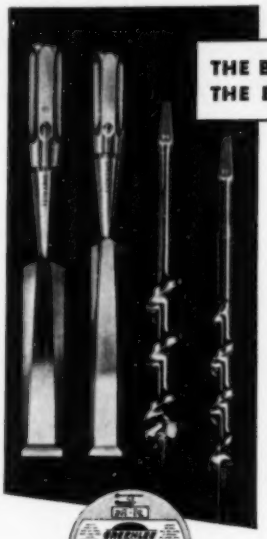

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Your students do good-looking work — and do it safely — because this Crescent Jointer puts four knives into action, instead of only three. And because a pivoted safety guard keeps fingers away from cutting edges.

More knife cuts per inch of stock travel mean smoother finished work with the Crescent Jointer; few knife cuts per inch would cause knife marks, or small ridges, to show plainly across the stock.

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CS-13

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with a Stanley-Carter Router and dovetail attachment

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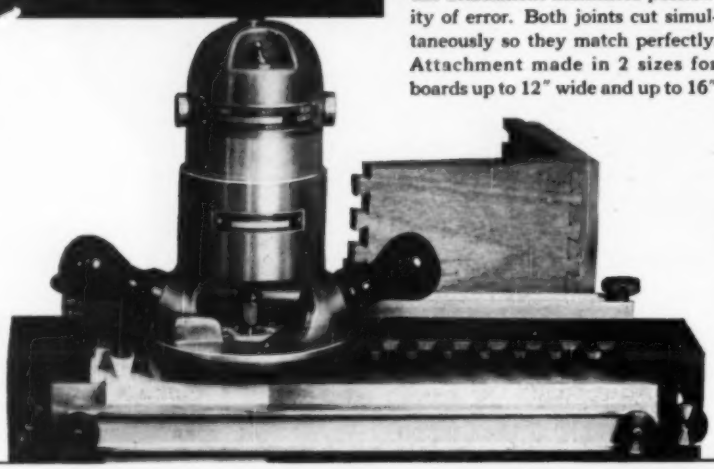

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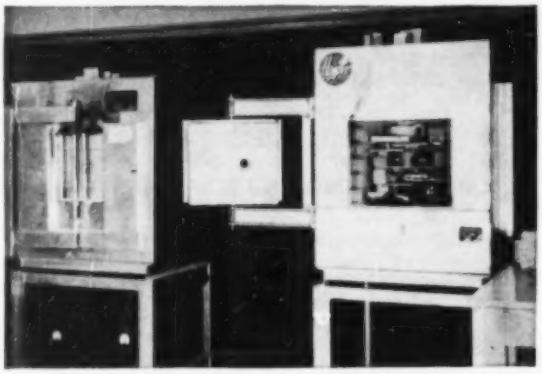

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IN SCHOOLS • UNIVERSITIES • ADULT EDUCATION PROGRAMS

The above photograph pictures two Harper High Temperature Studio Kilns installed at the Whitney Avenue Adult Arts and Craft's Center, Niagara Falls, New York. On the left is a side-fired model SK-101215-SF; on the right is an over-under fired model SK-151416. The kilns are fired alternately with the same transformer control which can be seen under the lefthand kiln. This kiln installation provides maximum firing space at minimum equipment cost.

Mr. Weldon R. Oliver, Director of Adult Education, in Niagara Falls says: "The experience of our adult education instructors and students in Ceramics in working with our Harper kilns has been highly satisfactory and pleasant. The use of such excellent equipment has contributed much to the interest shown toward our 5 large pottery classes." *Write for Bulletin 1246.*

HARPER ELECTRIC FURNACE CORPORATION

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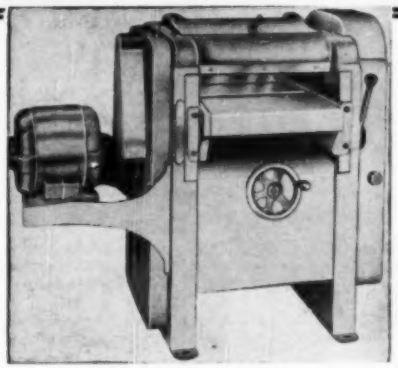

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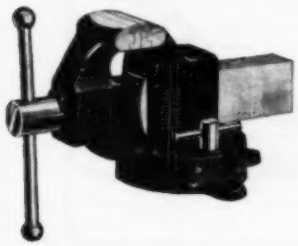

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The Requisition Number

The May issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION has been named the requisition number to remind you of the very necessary task of checking the items of equipment, materials, and supplies which you will have to order for next year. The advertisements in this issue as well as those in the preceding copies you have received since September, 1948, will offer you informative material which will make your task of making out requisitions much simpler and less wearisome.

This Month's Cover

The photograph used for the May cover was submitted by Harry A. Goldstein, sponsor of the Badger Camera Clickers, a photography club at the Tucson Senior High School, Tucson, Ariz.

It presents a picture of the dual-control driver-training car used by the students at the school. The picture was made by members of the photography club.

More Information About Summer Schools

Bradley University, Peoria 5, Ill., June 15 to July 21, and July 22 to August 25. **Colorado A. & M. College, Fort Collins, Colo.,** June 20 to July 15, and July 18 to August 12. **Cornell University, Ithaca, N. Y.,** July 5 to August 13. **Oregon State College, Corvallis, Ore.,** June 20 to August 12. **The Pennsylvania State College, State College, Pa.,** June 27 to August 6. **Purdue University, Lafayette, Ind.,** July 25 to August 6, and June 24 to August 20. **State Teachers College, California, Pa.,** June 6 to June 24, June 27 to August 5, and August 8 to 26. **State Teachers College, Oswego, N. Y.,** July 5 to August 12, July 5 to July 20, and August 1 to August 26; general-crafts workshop, July 5 to July 15. **The Stout Institute, Menomonie, Wis.,** June 20 to July 29. **University of Minnesota, Minneapolis 14, Minn.,** June 13 to July 22, and July 25 to August 28. **University of Southern California, Los Angeles 7, Calif.,** June 20 to July 3, and August 1 to August 27. **Wayne University, Detroit 1, Mich.** Six, eight, or ten weeks, beginning June 27; institute for drafting teachers, August 1 to August 13.

Coming Conventions

Apr. 19–22. New York State Vocational and Practical Arts Association, at Albany, N. Y. Headquarters, DeWitt Clinton Hotel. Convention chairman, Alexander C. Ducat, Albany, N. Y.

Apr. 21–23. Michigan Industrial Education Association, at Grand Rapids, Mich. Headquarters, Civic Auditorium. Secretary, Ward Sager, Central Michigan College of Education, Mt. Pleasant, Mich.

Apr. 21–23 (tentative). West Virginia Industrial Arts Association, at Jackson's Hill, W. Va. Chairman, Wm. B. Conley, Raleigh County Vocational School, Beckley, W. Va.

Apr. 28–30. Indiana Industrial Education Association, at Marshall, Ind. Headquarters, Turkey Run Inn. Secretary, H. G. McComb, 215 State House, Indianapolis, Ind.

May 5–7. Wisconsin Association for Vocational and Adult Education, at Milwaukee, Wis. Headquarters, Hotel Schroeder. Secretary, C. D. Rejahl, 114 N. Carroll St., Madison 3, Wis.

May 9–11. American Association for Adult Education, at Columbus, Ohio. Headquarters, Neil House. Secretary, Mildred V. D. Mathews, 525 W. 120th St., New York 27, N. Y.

May 9–11. National Council of Technical Schools, at Washington, D. C. Headquarters, Mayflower Hotel. Convention chairman, J. S. Noffsinger, 839 — 17th St., N.W., Washington 6, D. C.

May 12–14. American Industrial Arts Association, at St. Louis, Mo. Headquarters, Hotel Jefferson. Exhibits in charge of J. Ely Van Hart, 1117 Kipling Road, Elizabeth 3, N. J.

June 20–23. National Graphic Arts Education Association, at New Technical Trade School, Pressmen's Home, Tenn. Convention chairman, Fred J. Hartman, Room 412, 719 — 15th St., N.W., Washington 5, D. C.

June 21–24. Pennsylvania Vocational Association, at Eagles Mere, Pa. Headquarters, Forest Inn and Lakeside Hotel. Secretary, Henry S. Brimmer, State College, Pa.

VOL. 38, NO. 5 MAY, 1949

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THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

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Editorial Contributions. — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.

Articles Indexed. — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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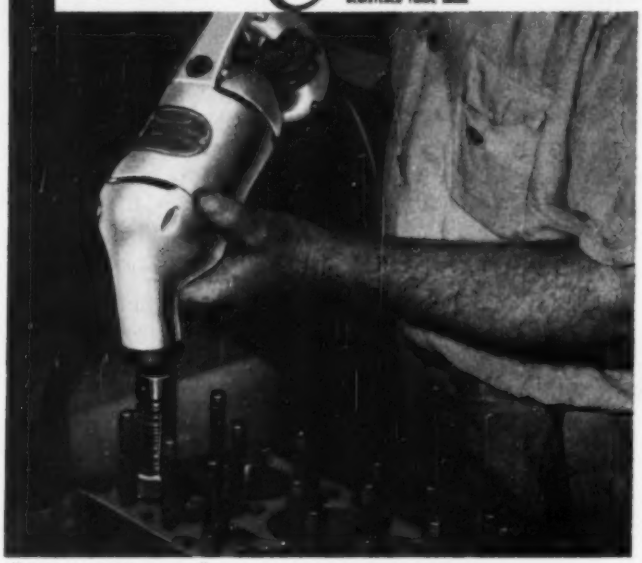

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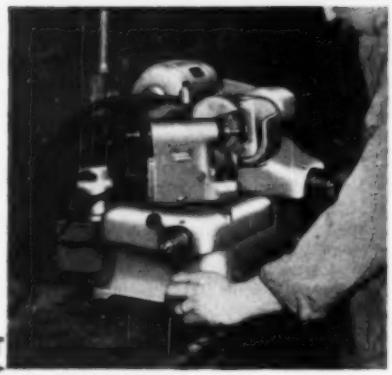

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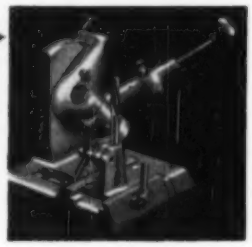

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MAY . . . 1949

The Department Chairman and His Job

GEORGE H. PARKES
The Williamsport Technical Institute
Williamsport, Pa.

The Department Chairman

This job analysis refers to the department or division head in a large vocational school. In a smaller program, it could refer to the director of vocational education, or the head of a department in a high school.

Weight Chart for the Criteria

Section	*Weight**
Business contacts	1
Community contacts	1
Costs	1
Getting things done	3
Knowledge of subject matter	3
Leadership	1
Loyalty	1
Orders and instructions	1
Professional growth	1
Property security	2
Public relations	1
Recruiting teachers	1
Safety	2
Student selection	2
Student placement	2
Teacher training	1
Vision and originality	2

The position of department chairman in the Williamsport Technical Institute is not intended to be a permanent assignment. It is conferred upon outstanding individuals to gain certain objectives, to give individuals a chance to demonstrate ability, or to recognize outstanding technical contributions. Changes in the circumstances surrounding the department or subject, or the inability of the individual to measure up to the responsibilities of the position can result in changes of status. Sometimes where individuals of about equal ability are under consideration, assignments will be alternated to give all an opportunity to establish their competency.

*The *weight* is a multiplier. Each section is rated from 1 to 10. If the weight is more than 1, the rating is multiplied by that weight.

The following analysis of the job of the department chairman is intended as a guide to those who wish to seek greater skill and value in this post.

Vision and Originality

The Technical Institute is essentially a jobbing organization. We accept assignments and contracts from other organizations, our own school divisions, individuals and employers. Each assignment is different, and the years seldom see us repeating our practices completely. Change is present to a far greater extent than is common in public schools. We have few traditions, fewer inhibitions, and we will take on any problem dealing with the occupational education of nearly anyone. The term "light on our feet" is probably the most descriptive of our state of mind. Therefore, vision, originality, adaptability, inventiveness and courage are the characteristics most sought in a department chairman, next of course to the basic fundamentals of good educational practice.

The department chairman measures himself by means of the accepted criteria for teachers, since he must first be a good teacher. He translates the factors for good teaching into the higher level of departmental leadership to measure his own performance and his example to his faculty. Thus, his department is well organized when every teacher is doing well the things set forth for him to do.

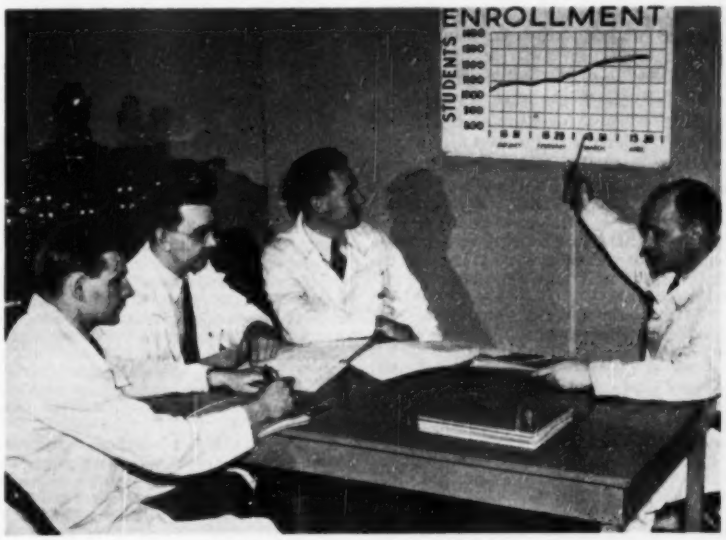
Vision and originality are difficult to measure by evaluative criteria, but the following criteria is a partial list:

The department chairman displays vision and originality when he:

a) Studies trends by means of research, reading, and observation.

b) Reports the results of his thinking in the form of suggestions for change and improvement.

c) Avoids too many ill-considered recom-



The department head holds frequent discussions with his teachers

mendations which "flare back" or result in unsuccessful experiments.

d) Avoids teaching as he was taught unless the methods stand up under severe scrutiny.

Leadership

The organization of the Institute is departmental. In so far as is possible, consistent with a well-co-ordinated school, each department operates as an autonomous unit. The department chairman is the leader of this unit, and some of the departments are of a size which brings out all of the leadership qualities necessary for the successful operation of a small high school or vocational department. The department chairman will, therefore, measure himself by his qualities of leadership. The following criteria will serve to remind the department head of some of these qualities:

The department chairman:

a) Knows the problems of his teachers and students and enjoys the privilege of discussing their problems with them.

b) Is objective in his dealing with his teachers and students. Regardless of friendliness, good will, and loyalties, he expects and obtains complete performance of all assignments and duties.

c) He is familiar with the professional growth of his teachers and sees to it that this growth is continuous.

d) He maintains a constant program of curriculum revision, research, project designs, lesson sheets, instruction aids, and other developments flowing through the department by means of written instructions to his teachers.

e) He keeps the office informed of the special accomplishments of himself, the faculty, or the students, and of any outstanding achievements of the department. A series of written comments of this type serve to document the accomplishments of the department and assist with personnel evaluations.

Knowledge of His Subject Matter

The department chairman is the Institute's co-ordinator for all matters pertaining to his industrial or business area of occupations. He might measure himself in this respect as follows:

The department chairman is:

a) Up-to-date on all of the latest developments in his occupational area, and is constantly expanding the thinking and knowledge of his faculty.

b) He is acknowledged by workmen and supervisors of the community to be an expert in the field.

c) He is constantly seeking ways to pass this new information on to his students, by demonstrations, special projects, reading courses, visual aids, factory visits, outside lecturers, and by personal experimentation.

d) He is "intellectually curious" about everything pertaining to the science and practice of his subject area.

e) He knows what other institutions are doing in his field and has many contacts with leaders elsewhere.

f) He measures the results of his department in terms of commercial practice and standards, with proper allowance for the inefficiency of the learners.

g) His department organization simulates modern industrial practice.

h) He avoids ineffective and time-consuming "government" and "favor" projects. Every project is measured by its value in the current education of his pupils.

Business Contacts

The department chairman is the representative of the Institute in so far as the special contacts for his occupational area are concerned. He interprets the school, and the school system, to his share of the public. He might measure himself in this respect as follows:

The department chairman:

a) Knows many supervisors, workmen, labor leaders, and businessmen in his subject area "by their first names."

b) Has entree into all outside establishments related to his subject area.

c) Exchanges courtesies with his industrial friends on the same basis as though he operated an outside industry.

d) Discusses recent developments with his business friends.

e) Belongs to and participates actively in the business organizations of his industrial contacts.

f) The department chairman is the co-ordinator for his field of activity. He arranges to spend a part of his time in following students and working with industrial and business contacts.

Community Contacts

The department chairman is a valued member of the community. He possesses the basic citizenship characteristics required of a professional man in a position of example and leadership. He recognizes that he is a public servant, and that he has no "private" life in the sense that he may violate the accepted standards of the community.

Specifically, the department chairman:

a) Belongs to fraternal, religious, service, and neighborhood organizations where citizens gather for the common good and for fellowship and improvement.

b) Participates in the work of caring for the underprivileged, in youth activities, such as scouting and recreation, and in service work for adults.

c) Serves on welfare and character building committees, takes part in fund drives, and supports all such community activities in a financial way to a generous extent, and stimulates others to do likewise.

d) Takes special interest in the development of new industrial and business activities which mean jobs and income for the community.

e) Accepts the "leg work" and necessary routine of these activities rather than seeking personal note and office in such organizations.

f) Exercises his voting privileges and takes part in the political life of the community.

g) In his public utterances, he avoids the negative, the controversial and the radical. He remembers that while he is privileged to risk his own good name, he represents a public institution which should not have to share any criticism which falls on him.

h) He may not use his office, his contacts with students or parents, his contacts with the public or businessmen to further any religious or political faith to which he may be attached.

Professional Growth

The department chairman must be professionally alert and growing. In general, the position of department chairman calls for the achievement of the master's degree, either in actual college credit or in equivalents in his special subject field. Other measures of professional growth are:

a) He belongs to local, state and national professional organizations and participates in the meetings of these organizations in so far as is consistent with his school obligations. Specifically, membership in the WVA, PVA, AVA, WEA, PSEA, and NEA is desirable.

b) He subscribes to and reads regularly at least one professional magazine in his field, and has a good understanding of the trends of education from reviewing others.

c) He participates in professional discussions.

d) He writes for his professional press. One article a year of published discussion is a reasonable goal.

e) He exerts a measurable influence on the improvement of the educational practice in his subject field and in furthering the objectives of the institute in this respect.

Public Relations

The department chairman is the non-commissioned officer of the Institute. As such, he holds the key position between the school and its patrons, students, parents, and the public. He may measure his effectiveness in this respect by the following:

a) He discusses problems involving students with tact, diplomacy, and even temper. He is most successful when he holds to the standards set forth by institute policy while keeping his public on the friendly side.

b) He will not offend a student or a parent by "standing his ground" unless to fail to do so would harm the real interests of his pupils. We all have a tendency to overrate the damage done if we recede from a stand we have taken.

c) He will not assume authority which he does not possess. For example, no teacher or department chairman has the authority to dismiss from classes, or use corporal punishment. He can only recommend.

Loyalty

The department chairman is the representative of the director in his department. He has the obligation of interpreting the objectives of the school to his faculty and students. He may measure his performance in this respect as follows:

a) He makes it his business to understand the policies of the school. If he does not understand them, he asks questions until he does.

b) He protests vigorously any policies which he thinks improper, but if he is reversed he follows the established policy cheerfully

and without displaying any evidence that he disagrees.

c) He is on the alert for outside comment or criticism which needs defense or change of methods. He reports these promptly and does everything possible to convey the proper information.

d) He scrupulously avoids any expressed or implied criticism of other departments, schools, or individuals, except in the form of frank and open, but private, discussion with the people concerned.

e) He does not "cover up" for himself or his faculty in the event of an error or a wrong attitude. To be in possession of information concerning a harmful condition or attitude, or a violation of instructions, without reporting the same is a serious breach of loyalty.

f) He does not interfere with the students or teachers of another department unless a serious situation impends. There is an exception in the case of safety; any teacher may intervene in any situation which he believes to be a hazard to the personnel or property if he cannot make immediate contact with the person of original responsibility. Stop the practice first and discuss it afterward.

g) He works full time at his job. It is difficult to see how a department chairman can meet the high standards of our organization while sharing his energies with an outside job.

Property Security

Next to the security of personnel from accident or injury, the department chairman is obligated to protect the public property in his charge. He therefore:

a) Maintains a constant and detailed check on all equipment and tools belonging to the department. It is not sufficient that he have no knowledge of loss or theft, but it is imperative that he have positive information that there is no loss or theft or to report promptly the incidents involving loss or theft.

b) He is on the alert for the careless use of public property or malicious practices tending to harm property. He reports all violations promptly and impartially, and takes such steps as he can to overcome improper practices.

c) The Institute has a vast and variegated amount of property which is extremely attractive and a temptation to theft or conversion. The department chairman removes this temptation by means of positive checks to the point of "fussiness" and makes absolutely certain that no public property is converted to private use in his area without proper authorization.

Orders and Instructions

The normal path of instructions in the Institute is from the superintendent to the director to the department chairman to the instructor. It is extremely important that the department chairman follow his instructions to the letter, since failure to do so may complicate or defeat some comprehensive plan of which his share is an important part. As to orders and instructions, the department chairman:

a) Carries out orders promptly and with enthusiastic participation. The "slow down" has no place in the Institute, whether it arises from carelessness or design.

b) Unless otherwise noted, the department chairman assumes that all orders passed on by the director are important and to be executed with dispatch.

c) In so far as possible he transmits orders to faculty and students in writing, keeping a copy, fixing deadlines, giving specific instructions, and requiring progress reports.

d) He follows strictly the announced policies of the school as to purchasing, bookkeeping, student records, property records, and the mechanics of the school organization.

e) He uses written memoranda in passing out instructions to the staff whenever possible, and makes a systematic checkup on the results of these instructions after a proper interval.

Teacher Training

The department chairman is in part a teacher trainer. He meets the requirement of this criterion when:

a) His faculty moves progressively toward full professional standing under his example and encouragement, by means of college classes, organized professional reading, observation of other schools and classes, and departmental conferences.

b) He holds regular departmental meetings, keeps minutes, and distributes these minutes to the participating teachers.

c) He keeps a written record of a mutually arrived at plan for each teacher's personal growth.

d) He participates effectively in the teacher education of visiting teachers assigned to the Institute for observation and training.

e) He masters the technique of conference leading as typified in "Foremanship and Supervision" by Frank Cushman (Wiley).

Recruiting Teachers

The department chairman has the obligation of keeping in touch with prospective teachers in his subject area, especially those prospective teachers who are still in industry, business, or in school.

a) He encourages high type former students to interest themselves in teaching and follows and assists them as they develop.

b) In conjunction with the long-range planning of his department, he is in a position to recommend suitable candidates as the need for their services arises.

c) He avoids making any promises or commitments to prospective teachers until decisions on the matter in question can be obtained from official sources.

d) He plans his recommendations for the replacement, exchange, or reassignment of teachers so that the departmental morale is retained and the instruction program does not suffer from abrupt or ill-advised changes.

Student Placement

No department in the Institute can continue to operate unless its graduates go to work in the field of major training. A good department chairman therefore:

a) Knows employment conditions in his field in great detail and plans his instruction with specific pay-roll jobs in mind for particular individuals as they approach graduation.

b) Knows what becomes of his graduates, their place of employment, their approximate earnings, and their further educational needs.

c) Recommends the expansion or curtailment of departmental enrollments far enough in advance to meet the employment needs of the graduates.

Student Selection

The Institute operates in a wide territory and has expanded its facilities to the point where a constant program of student recruitment must be maintained. Keeping his department filled to the limit set by his estimate of future placements is a responsibility of the department chairman. To measure up to this responsibility, the department chairman should:

a) Maintain personal contacts with graduates and former students, who in turn tell new prospects about the Institute.

b) Prepares for printing and duplication attractive folders and news letters to his field contacts as new courses open, or vacancies occur.

c) Maintains a personal list of agencies and individuals in contact with youth, employment and personnel problems in a wide geographic area for purposes of keeping the public informed on his work.

d) Studies the kind of news the home town newspapers like to use, and sees to it that these newspapers learn about important happenings to their home town boys. He maintains good relations with newspapers, radio stations, and other media of public information.

e) Avoids, whenever possible, students leaving the school with a negative or critical attitude.

f) Assists his students to find part-time jobs, rooms, church affiliations, social contacts, etc., so that their stay in the Institute is as agreeable as possible.

Getting Things Done

"He gets things done" is one of the happiest compliments an Institute staff member can be given. Every department chairman should aim at earning this accolade. Here are some things he can do:

a) Take every assignment seriously. Do something about it at once, and do something about it every day until it is completed. A "dropped" job is difficult to revive.

b) When an assignment is passed out or originates in the department, the department chairman should immediately make out a progress chart, breaking the job down into its natural elements and in turn plan each element completely.

c) Avoid the "chain reactions" technique. This means the practice of completing one part of the job before giving thought to the associated parts. Plan all parts together, starting the more tedious parts long in advance so that all parts meet in time for the deadline date.

d) Make frequent reports on progress to the office.

e) Order parts, or equipment or services in ample time to avoid "bottlenecks."

f) Remember that projects and assignments soon get old if delayed in execution. Once they become an old story, no one has much enthusiasm for them.

g) If difficulties are encountered, raise questions with the office or source of the project at once. Do not wait until someone starts to check up.

Costs

The Institute is a public tax supported institution, although it receives some of its income from several taxing bodies. As a user of tax funds, the Institute is under obligations to justify its services in terms of services rendered and the cost of these services. Therefore, the department chairman will, in his own department, have a keen interest in the cost of doing business.

a) He will interest himself in office cost records and be familiar with the general costs of the school.

b) He will try to see how the costs in his department compare with other departments or the school as a whole.

c) He will be cost conscious. If he requests an item of supplies or equipment, or a service, he will do so in the light of estimated costs and the funds available.

d) He will obtain his departmental budget estimate and will endeavor to keep within this budget.

Safety

The first responsibility of the department chairman, and every staff member, is the safety of personnel. The Institute has a fine record for teaching safety and for safeguarding its personnel, and this record must be maintained and improved. As to safety, the department chairman:

a) Is familiar with the safe practice standards of the National Safety Council in his field of industry and insists on these standards being maintained.

b) Lets nothing get in the way of safety. Regardless of the need for getting something done, being at a certain place on time, or achieving any other goal, nothing is done in violation or ignorance of safe practice. It's bad to lose your goal, but an accident is a high price to pay for achieving it.

c) Considers every chance taken as an outright violation.

d) Investigates every accident in his department, no matter how slight, and sees to it that the accident report contains an intelligent and objective statement of its cause.

e) Makes his accidents opportunities for instruction in safety.

APPENDIX

The Department Chairman as a Personnel Officer

Industrial personnel workers have, over a period of many years, gathered together some principles of good human relationships in industry which will help the department chairman to do his job better. Here are some of the more common characteristics of a good leader:

a) He is interested in the personal problems of workers along with his business connections. The supervisor who shares the problems and successes of his subordinates is a good leader.

b) He is especially attentive to new workers on the first day and in the first few days of work. He sees that they have a place to work, that they understand their jobs, that they are introduced to their fellow workers, and have some companionship off hours if they are complete strangers.

c) He makes certain that the new worker knows what he is to do beyond a shadow of a doubt.

d) He passes out authority with responsibility.

e) He stands up for his workers if he thinks they are right.

f) He makes his constructive criticisms in private. The "bawling out" technique is out of date.

g) He makes certain that meritorius performances or suggestions made by workers are properly credited to them in reports. He never represents such performances as his own.

h) He uses the "we" pronoun. He considers himself a part of the team and he gives the team credit for the achievements of his department.

i) He keeps his promise.

j) He treats everyone alike. He has no "teacher's pets."

k) He gives every worker a chance to learn about the job ahead if he is so disposed.

Industrial Education For General School Administrators

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Is the general school administrator responsible for the development of industrial education? Has he had experience in industry or in teaching any phase of industrial education? Does the school administrator think he should have had industrial education in his professional preparation? Do graduate schools include courses in industrial education as part of the training for general school administrators?

These questions are the basis of a study[1] made during the winter of 1947–48. While the answers obtained may be valid for a comparatively small number of administrators in a limited area (one state) it is believed that they are indicative of conditions generally.

Industrial Education is interpreted throughout the study as defined by Friese.[2] It is

> a generic term including all educational activities concerned with modern industry and crafts, their raw materials, products, machines, personnel, and problems. It therefore includes both industrial arts and vocational-industrial education.

The Procedure followed was, first, a review of the professional literature concerned with the topic; second, a survey of the training and experience of school administrators in one state; and third, a study of the courses offered in administration by graduate schools.

Professional literature for administrators leaves no doubt as to who is responsible for the development of industrial education. The following statement in the *Twelfth Yearbook*[3] is typical. Speaking of the superintendent it says:

> He is the executive of the board and must make effective its decisions. . . . The superintendent is also the professional advisor of the board. . . . Finally the superintendent is *supervisor* of instruction. . . .

There is a diversity of opinion concerning the inclusion of industrial education in the professional preparation of school administrators. Murphy[4] recommends four units. Lund[5] believes that the

[1] William E. Caswell, *Industrial Education for General School Administrators*. A Study of Their Experience and Training in Industrial Arts and Vocational Industrial Education, Pennsylvania State College, 1947–48, 62 pp.

[2] John F. Friese, *Course Making in Industrial Education*, p. 7 (Peoria, Ill.: Manual Arts Press, 1946).

[3] Department of Superintendence of the N.E.A. *Critical Problems in School Administration*, the Twelfth Yearbook (Washington, D. C.: The Association, 1934).

[4] A. B. Murphy, *Basic Training Program for City School Superintendents*, doctor's thesis, University of California, Berkeley, Abstract in *School Executive* Magazine, Vol. 51, pp. 291–293, Mar., 1932.

[5] John Lund, *Education of School Administrators*, U. S. Office of Education, Government Printing Office, Bulletin No. 6, 1941.

professional education of school administrators cannot be complete unless it deals at some point with the problems of policy, organization and administration of vocational education.

Hayes[6] suggests that school administrators be informed in areas affecting "the total educational pattern."

Grace[7] is among those who think that the specification of courses for administrators is undesirable. He says:

> Ultimately, it is probable that admission will be on a basis similar to that presently prevailing in the legal and medical professions.

This statement seems to be inconsistent in the case of the medical profession. A review of a medical school catalog[8] indicates that "the required work occupies approximately two thirds of the student's time," in a four-year program.

The tendency to be wary of specified courses was also noted among the practicing school administrators who participated in the study. Forty-eight of 68 respondees recommended a mean of 5.2 semester hours work in industrial education. The comment by those who would not include industrial education in the preparation of school administrators fell into two general classifications.

First, those who felt that industrial education was not important, that it was "no more necessary than Spanish."

Another expressed his opinion thus:

> There are too many other, and more important areas necessary for the training of a school administrator to permit devoting time to this field.

Second, those who thought that it was important but not more so than other so-called special fields. Two quotations which express this opinion follow:

> There is no reason why a superintendent of schools should have training in industrial education any more than in home economics, music, football, basketball, track, coaching, flying, art, and so on. These courses would of course be beneficial but certainly are not essential to good administration. What is essential is a broad understanding of educational values in the various school subjects.
>
> I do not think industrial education should be a requirement for an administrative position although it would no doubt be of value to one in such a position. There is also danger in one having such highly specialized training in any field, because of the tendency to emphasize that field too much.

[6]Will Hayes, "Informed School Administration," *Educational Administration and Supervision*, Vol. 33, No. 2, Feb., 1947, p. 104 (Baltimore: Warwick and York).

[7]Alonzo G. Grace, Commissioner of Education, Connecticut, in the Forty-fifth Yearbook of the National Society for the Study of Education, 1946, p. 176.

[8]John Hopkins University Circular, School of Medicine, 1947, p. 76.

Other Qualifications

A second type of comment which appeared on both negative and affirmative returns suggests that industrial education for administrators should be of a philosophical nature — principles — not laboratory courses:

> Background should be obtained not necessarily through industrial education courses but if not in this way through vocational guidance courses.
>
> . . . As a part of a broad offering of the aims and purposes of vocational education with emphasis on its various phases, industrial, commercial, agricultural, etc.

"Desirable but should not be required," is a point of view expressed in several comments.

Training and Experience

If there is danger that a school administrator might emphasize his special field of study and experience, then there is little possibility of industrial education being overemphasized. In the *Eleventh Yearbook*,[9] on page 346, is shown a table presenting the type of training received by 2050 superintendents. Only .15 per cent of them received instruction in industrial arts, and none had received training in vocational-industrial education.

Other tables, on pages 348 and 349, show that 86.63 per cent of the superintendents reporting had four or more years of undergraduate college work. Of these 72.04 per cent were graduates of liberal arts colleges.

Of 2203 reporting graduate work, 76.03 per cent majored in education. None indicated industrial education as a field of interest or study.

The results of the study indicate that present-day school administrators have had a little more training and experience in industrial education than those reported in the Eleventh Yearbook. Five of 69[10] representative school administrators have had teaching experience in industrial education. Of these all five had taught industrial arts and one had taught vocational-industrial education.

One administrator taught mechanical drawing in his last full-time teaching position. Mathematics was represented 29 times, and science was represented 25 times in the last teaching position of the 69 administrators.

Six of the administrators had had professional preparation in the field of industrial education.

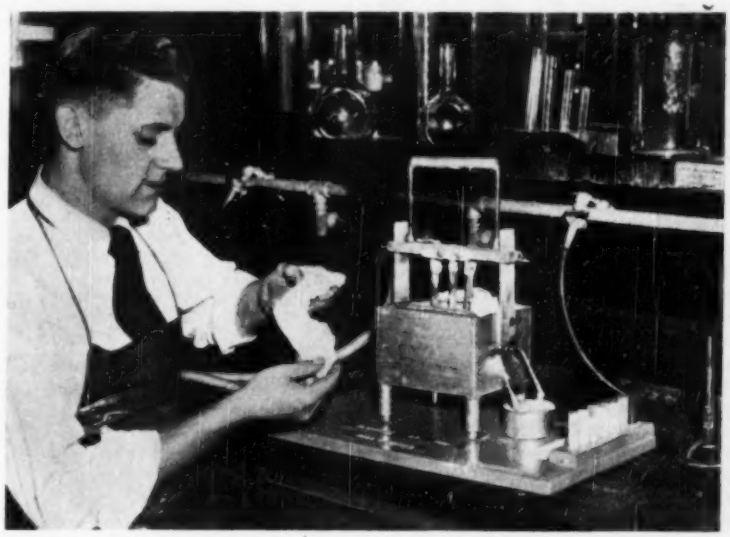
A majority would recommend some training in industrial education. There is considerable disagreement concerning the amount of preparation and how it should be obtained.

Opportunities for Graduate Work

A study of catalogs issued by graduate schools shows that opportunities for ad-

[9]Department of Superintendence of the N.E.A. *Educational Leadership, Progress and Possibilities*, the Eleventh Yearbook (Washington, D. C.: The Association, 1933), 265 pp.

[10]Twenty superintendents and 49 principals.



Stanley Sitta, Cicero, Ill., wins two special merit awards from Morton High School, and top prize in state science exhibit at Benton, Ill., with a working model of Martin Hall's original reduction cell which actually produces aluminum just like big aluminum reduction plants

— Reynolds Metals Company Photograph

ministrators to secure professional training have been expanded. Within the limitations of this study there are 28 institutions in 25 different states offering 514 graduate courses. In 148 of these courses special problems may be studied. Fifteen of the courses have industrial education content and 15 are especially planned to acquaint administrators with the philosophy and practice of industrial arts and vocational-industrial education.

Conclusions

Interpretation of the data in the study seems to justify the following conclusion:

1. Industrial education is an important part of the total program of education.

2. In the professional literature, association proceedings, and in graduate school course content, the vocational phase of industrial education is given much more attention than industrial arts.

3. General school administrators have a limited amount of experience and professional preparation in the field of industrial education.

4. There should be at least six semester hours of industrial education courses or the equivalent in the professional preparation of administrators. This conclusion is based on an interpretation of the literature reviewed and on the recommendations of school administrators.

When disagreement with the preceding conclusion is expressed it is usually in the following terms:

a) Desirable but impractical because of the many areas in education.

b) Specific courses should not be required.

c) There is danger of an administrator overemphasizing a field in which he has had training.

5. Courses in industrial education for administrators should be concerned with the philosophy of industrial arts and vocational-industrial education.

6. In comparison with earlier studies, this study shows evidence of a trend to include industrial education in graduate school courses for administrators.

7. There is considerable evidence both in the literature and in the comments that some administrators do not differentiate between the various phases of industrial education.

This condition is to some extent due to the following:

a) All shops look alike to the uninitiated.

b) In many states and local districts the administration of industrial arts and vocational education is delegated to the same authority.

c) The differences in terminology used by industrial educators tend to confuse general school administrators.

Recommendations

This investigation should be considered as a pilot study. It may be used as a guide for a further study consisting of:

1. A survey of current texts in school administration.

2. A survey of current literature in industrial arts and vocational education.

3. A study of the laws directly affecting this type of education.

4. Compilation of a check list of topics which should be included in courses for administrators.

5. Evaluation of the check list.

6. Preparation of readings in industrial education and/or a comprehensive annotated bibliography.

In-Service Development of Industrial-Arts Teachers

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When one considers *the meaning of the term "In-Service Training"* the emphasis should rest on the word *service*, for preparation of teachers is a never ending obligation for those who train teachers, and is also a ceaseless process for those who desire to be efficient members of the teaching profession. A teacher usually enters his field of work a short time after that momentous week in his senior year which is termed commencement week . . . a fit adjective to describe this particular week in his life, for all are keenly aware of the implications of that term.

While it is true that colleges are responsible for the training and the preparation of these neophytes in the field of teaching, it still behooves a teacher to upgrade his profession when he gets on the job. In-service training may be interpreted, therefore, to mean the *continued application and desire* for further information and skill which will make the newcomer in the industrial-arts a master teacher. It is one of the most efficient forms of teacher training.

No doubt exists in the minds of sincere educators that *there is a definite place and need* for in-service training. This training is a personal service, for it operates on and through the individual to expand his activities into a greater program for the shop, the school, and the general public, the taxpayer. Leaders in the industrial teaching field have been striving continuously to upgrade instruction through some means of in-service training, whether it be a smaller program conducted by a city supervisor, or whether it be reading of inspirational nature or other constructive activity by teachers in communities that are not reached generally by any type of supervision by the state, the region, or the college.

What are some of the *results that may be expected?* Surely the taxpayer has a right to expect results. Management of industries expects, and gets, results. Directors of programs and agencies demand results, so why should not the teaching profession expect and get the results desired? Individually and collectively there is a vital force of unlimited benefits to be derived from intelligent and enthusiastic direction of such a program.

Sometimes the program is rigid and prescribed; however response is usually best to one which is flexible and suggestive, and placed on a co-operative basis. Flexibility might be carried too far, however, as was the case of the little girl attending an ultra-progressive school: She arrived one morning, and with a sad look asked the teacher,

"Do we *have* to do what *we want to* today?"

Frequently in-service training is dependent entirely upon personal initiative, and in this event results cannot be expected if a little effort toward in-service promotion is not instigated by the teachers. Most will agree that they learn more their first year on a new teaching assignment than they did during the four years when they were exposed to the industrial-training programs in college.

The *obligation of the teacher* to avail himself of in-service development is mandatory. Some are ready for new ideas and are willing at all times to apply these in teaching, provided they can understand how the newer ideas can be made applicable to their regular job, but it is discouraging when attendance at regional and state meetings is only 10 per cent of the teachers engaged in the field. It doesn't seem to matter where these meetings are held, for it is usually that same 10 per cent which avails itself of the opportunities for this type of development.

The *obligation of teacher trainers and supervisors* to assist teachers is a must. Those in the teacher-training field and those engaged in supervision must assist teachers to get in-service training. Frequently too much reliance is placed upon individual initiative and when no particular effort is made, it is concluded that the teacher is not interested. It must be remembered that teachers, contrary to general opinion, are human and that they need individual guidance and direction. However, once assistance is directed toward them, their response to this interest is gratifying, as most city supervisors and teacher trainers will confirm.

There is a complacent feeling in this field that the job is completed when the prospective teacher finishes his senior year. In terms of good teaching and good salesmanship, step four has been omitted; namely, the testing or final checkup on the individual to see if the efforts in training him have been productive and successful, or have been in vain. In either event, this new teacher will welcome assistance.

Those who have been in the field of industrial-arts teaching for 15 or more years realize that the program has changed considerably during that period; hence there never comes a day when one is equipped to do the job as expertly and competently as it should be done. New innovations and ideas, progressive civilization, and recognition of economic realities presuppose that one learns a little every day and contributes his bit to the changing picture.

The *school administration also has obligations* to foster school improvement programs. It takes an alert administration and supervisory staff to outline and expand the many possible means of upgrading the in-service trainees. The direct responsibility of supervision is to improve instruction, hence it becomes the essential task of the supervisor to provide the means whereby a teacher may avail himself of the many opportunities that he may develop into a competent, alert individual force in his chosen field. Teachers have differences with respect to interests, needs, and capacities, therefore, probably no two supervisors or their programs can be identical. The groups which are of most concern are made up of the teachers in smaller cities and towns where there is no direct supervision by one trained in that art. Means must be devised to promote programs of interest for these industrial-arts groups also.

The *types* of in-service training programs are city supervision; college teacher-training follow-up; national, state, and regional supervision; and self-improvement.

City supervision, the first type of in-service program, is of prime importance. Several of the leading exponents of this training stated that they considered their jobs of supervision to be wholly in-service upgrading through (1) improvement of classroom teaching; (2) development and maintenance of the morale of the teaching staff; (3) promotion and stimulation in general of the in-service improvement of the staff; (4) revision of courses and selection of teaching material; and (5) evaluation of the efficiency of the teacher and his teaching.

Improvement of classroom teaching can be brought about in several ways. Actual classroom visitation to the teacher who needs help is one way; these calls may be routine or may take place because the teacher needs and has asked for help and assistance; or he might want to show something he has developed. By this means the supervisor locates many weak spots in instruction and organization and can institute the required remedial measures.

A second way to help classroom functioning is to obtain further data for forming a diagnosis and later suggesting remedies to correct observed weaknesses. The suggested treatment might be placed before the individual in conference, or if the fault is a common and reoccurring one, it could be discussed in a group of interested teachers. Above all, the problem should be solved in a co-operative manner and should carry no taint of dictation or coercion.

Another means of in-service upgrading is to provide demonstration for directed observation. Some find it advantageous for teachers to meet in different shops for various meetings and to emphasize some especially progressive piece of craftsmanship which is being worked out in the host's shop.

Problems of shop and classroom organization can be solved co-operatively. These involve such topics as tool checking, storage, machine placement, work area planning, care of teaching materials, and last, personnel organization. If these develop smoothly as the result of the efforts of the teacher, the committee, or the group, more ideas will be placed in working order in daily planning, and, of course, the entire organization will benefit.

The second task of the city supervisor, after classroom teaching has been improved, is *to develop and maintain the morale of the teaching staff*. This involves constructive and impersonal criticism. Teacher initiative must be encouraged. Due recognition to the originator of ideas must be emphasized. Rewards are as sure an incentive to adults as they are to children. Team spirit within an organization is a powerful force; just as powerful as it is in competitive athletics. In reality, team spirit is confidence in one's own ability plus confidence in his co-workers.

The city supervisor *promotes and stimulates the general in-service improvement of his staff*. He accomplishes this through direction of professional reading, group study, and correspondence and extension courses. Teachers should be encouraged to attend all group activities pertaining to industrial arts, whether they be city, county, regional, state, or national in scope. That is the ideal attendance goal, but one which is seldom reached. Some benefits of group attendance can be brought to the teacher with the importing of leaders in the field to conduct conferences and give lectures. This is money well spent.

Revision of courses is the fourth duty of the city supervisor. It involves the study and alteration of objectives and techniques. Courses from other cities and states must be scanned to ascertain the general trend of the field, and to check materials and methods being used elsewhere.

The fifth duty of the city supervisor is *to establish an evaluation criteria for the science of teaching*. Tests must be built and used correctly. The results should be interpreted accurately in order to test the students and also to check the effectiveness of the teaching.

Type two of in-service development programs is College Teacher-Training Follow-Up. There are many plans in different states which are placed on a co-operative basis, where one, two, or more teacher-training institutions provide supervision by

having one of the regular staff members spend a portion of his time assisting teachers in the smaller communities. In one of the larger states the critic teacher of a leading industrial-arts teacher-training school devotes all of his time in the centers where they have master teachers, and where they place their practice teachers. This is in-service development with a capital *I*.

Type three is national, state, regional, and district supervision. Approximately 30 per cent of our states now have one or more supervisors who devote their time exclusively to industrial-arts education. Several others have part-time supervision. However, most have no supervision of any description which originates out of the state department of education.

Self-improvement is cited as the fourth type of in-service development. This type takes into account membership in professional organizations, from which there is no telling when one may get a new idea! Attendance at meetings and conferences improves oneself as does additional study. Reading magazines and industrial periodical literature broadens one's scope. The desire and aptitude to write, visits to other schools, and industrial inspection tours all enlarge the perspective of the field.

Teachers are imbued early in their training years that it is desirable to join student organizations relating to industrial arts; usually this will encourage the student to follow this up with membership in the many professional organizations later on in their teaching field. There are approximately 35,000 industrial-arts teachers in the United States; only about 3500 . . . 10 per cent . . . belong to national industrial arts or vocational associations. *Attendance at meetings* and conferences is another means for personal improvement. Presence at such gatherings indicates a desire to learn something of a professional nature. Sectional meetings devoted to shop skills and practical demonstration in the regional, state, or national meetings are proving popular. When they include at least one demonstration of working with new materials, or give newer applications for the old, much merit is derived by the observer.

Who will question that *additional study* improves oneself? Many teachers avail themselves of the opportunity to go further in search of formal education; some continue toward advanced degrees; while others attend special craft schools for personal advancement in their particular field. Short courses offer opportunities for self-improvement also. One of the most interesting is the industrial-arts clinic held annually for one week at a midwestern college. This program was started a few years ago and is now proving itself unusually popular. Enrollment is now limited.

Teachers can also enrich their programs and thereby upgrade their in-service training by sponsoring inspection trips for the students to industries in the local and surrounding communities.

The *beneficial factors to be derived* from in-service training and development may be said to fall under the following four headings: (1) benefits to youth, (2) benefits to the profession, (3) benefits to the school, and (4) benefits to oneself.

Youth is enthusiastic, pliant, and eager to learn. He is a sponge that absorbs readily and indiscriminately either good or bad, so it is up to the teacher to see that he gets the good.

He must be offered *better instruction* through a well-planned program; wider opportunities for expression, and advantage of his resourcefulness must be taken into account in order to carry on a stimulating program. Youth must be offered a *wider scope of shop study and activities*, but the teacher will have to remain alert to do it. Hobby and club activities enrich the scope and content of shop courses; they also present opportunities for excellent personal expression for the student.

Better project selection results from in-service development. The word *project* is used advisedly for lack of a better term to designate the problem or vehicle on which the student works out the learning units which have been set up. In-service training gives opportunity for exchange of project selection and enrichment of present designs.

Youth must have a *high standard of workmanship* stressed — higher than the current trend. The sloppy thinking and attitudes toward skills which exist in too many of the shops today must be eliminated.

The teacher, finally, can offer youth an *improved shop and laboratory* layout; one which is up to date, progressive, and stimulating. Extend youth the challenge of better work and he will accept it eagerly.

The profession benefits when all in the industrial-arts field improve to make the reputation of this field in general more worth while; administrators and the taxpayers will recognize the intrinsic worth of the improved program. Higher regard for the work will foster real achievement.

The school benefits from in-service training in many ways. It gets a higher scholastic rating if the offerings are what they should be. The reputation for an alert industrial-arts program will attract better teachers in the field, which will result, naturally, in a much better program. The community will offer willing support in such expansion as will inevitably develop.

Stimulation of friendly competition among the industrial-arts teachers never hurt anyone. The term *friendly* must be remembered though. The larger school systems, as well as the smaller ones, benefit whenever a new teacher comes in with a battery of progressive ideas. The other teachers in the department take note of his progress and in order not to be outdone, they, too, will put innovations into effect.

A few of the many personal benefits one receives as the result of a sincere effort toward in-service development are, first, *promotion:* The better teacher always receives promotion, or so one likes to think; it may be in the same school system, or it can be an opportunity to progress elsewhere. Second, *increased salary:* Administrators are quick to recognize individuals who prepare themselves to be better teachers; conversely, they are equally aware of those who do only the minimum amount of work. Third, *recognition* in the profession: This comes to those who make the effort and get their feet off the desk! It will come in any of the several ways mentioned, or in publicity due to the contribution of making that traditional better mousetrap about which one hears so much. Participation in group undertakings and in various meetings also enlivens the tedium of daily teaching. Fourth, *personal satisfaction:* This cannot be underestimated. Teachers are keenly concerned with performing their tasks satisfactorily, and they derive a great amount of satisfaction in making a worth-while contribution.

One should remember that America was founded upon the tradition of work. It is sad but true that the majority of youth has now drifted away from that glorious and proud heritage. It is one of the responsibilities of the industrial-arts teachers in particular, to re-educate youth to like to work and to take pride in his undertakings.

In-service development will awaken in the teacher the satisfaction and respect for work well done; he, in turn, should pass it on to the student. It is through industrial arts, or so one likes to think, that respect for craftsmanship and the willingness to work that is so essential for a well-balanced and highly gratifying life, can be developed. If one can do things well, he is happy; if he is happy, he is content; if he is contented, he takes pride in citizenship; and if he is an active citizen in his community, he is a vital force for good, and society needs that force today as never before.

Some Leaders in Industrial Education

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(Continued from page 56 of the February, 1949, issue)

William Elmer Roberts

For the first time in this series I am writing about a leader who is still living, although no longer active in the field in which he made a major contribution. The story of his career belongs in this series, for his contribution was notable in several particulars.

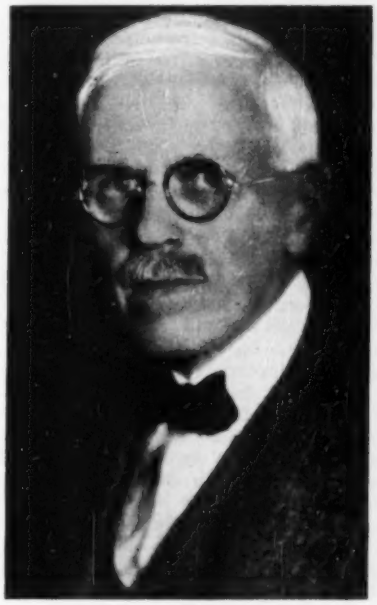
Whenever I think of Mr. Roberts, the first thing that comes to my mind is the impression of his genial personality. Aside from his accomplishments as an educator, he is one of the most delightful men to know personally. I am proud to have cherished his friendship for nearly 50 years. He was always extremely modest and unpretentious about his own attainments, but proud as could be of the achievements of his associates, the industrial-arts teachers in Cleveland schools. I visited him in Cleveland on several occasions, when he would take me out in his car for a tour of the schools. His story was all about what a fine job Mr. A was doing at this school, Mr. B at that school, and so on. On one of these visits it happened that he had a meeting of his industrial-arts teachers scheduled for the late afternoon, and he invited me to speak to "his boys," as he called them. The meeting gave me an excellent opportunity to observe the esteem and affection in which he was held by the members of his staff. This impression was confirmed in many ways on many occasions.

I have begun this sketch at the end instead of at the beginning, but this is a good place to relate an incident that tells something of the man and his personality. Since his retirement from active duty at the close of the school year in June, 1933, he has made his home in Dunedin, Fla. In March, 1938, I was invited to address the annual convention of the Southeastern Arts Association in Tampa. As soon as the announcement appeared of my name on the program, Mr. and Mrs. Roberts sent an invitation to Mrs. Bawden and me to be their guests during the convention.

As usual, I made out a schedule for the trip. It called for our arrival at the Roberts home in time for luncheon, at 12:30 p.m., Tuesday, March 8. When we pulled up at the curb the speedometer showed that we had traveled exactly 1500 miles. But, alas, we were 30 minutes late! It was one o'clock. It required a lot of explaining to account for the extra 30 minutes.

The Roberts home at Dunedin, approximately 25 miles west of Tampa, is on the west coast, and fronts on the Gulf of Mexico — perhaps I should say Clearwater Bay — with a wonderful view from the front porch. The grounds are landscaped with palms and other tropical planting, with orange, lemon, grapefruit, and tangerine trees in bearing. I remember that Mrs. Roberts went out in the morning and picked oranges off the tree for breakfast.

One of my assignments at the convention in Tampa was to conduct a panel or forum discussion on "Problems of the Industrial-Arts Teacher." A panel of five speakers had been selected to participate in the discussion. On the way over I invited Mr. Roberts to take a place on the panel, but he begged off, saying that he had been "out of the harness" for five years, and he was sure it would be too much of a nervous strain to appear before an audience. However, I persuaded him to take a place on the platform, where the members of the panel were seated at the side of a long table, facing the audience, with the understanding that he would not be called on. The discussion proceeded in a very informal manner, and Roberts soon felt quite at home in the consideration of questions upon which his more than 40 years of experience qualified him to speak with authority. He was unable to resist the opportunity to "get in there and pitch" when the discussion got to the question-and-answer stage. I am sure that members of the audience would have been astonished if they had been told that Mr. Roberts had asked to be excused on the ground that he "might not be equal to the occasion." He told me afterward that he really enjoyed getting back "on the firing line" once more, and he would not have missed it for a good deal.



William E. Roberts

The Art Side of Industrial Arts

Another distinctive characteristic of Mr. Roberts that I would emphasize is his contribution to the art side of industrial arts. During the 50 years and more that I have been a student of this subject, not more than three or four industrial-arts men of all those whose work I have observed have approached Mr. Roberts in the extent and significance of their contributions in this particular, and none has surpassed him.

As will appear later, Mr. Roberts was actively engaged in industrial arts at all levels, from the kindergarten, through the elementary school, secondary school, and the training of teachers in college and university. In every phase of this work he was able to

inspire teachers to the attainment of artistic standards and a fine quality of design seldom seen outside the art schools. He was himself an artist and a fine craftsman in everything he did. In only a few cities in the country were the products turned out by pupils from the kindergarten to the senior high school characterized by such uniformly high quality of both design and craftsmanship.

I must postpone further comment along this line for the present, and turn now to a brief account of his early life and professional career.

Early Life

William Elmer Roberts is a native of Massachusetts, having been born in Cambridge on July 21, 1866. At the age of four he moved with the family to Somerville, and three years later to Watertown, Mass., where he grew up to early manhood. Ill-health during childhood interfered with attendance at public school, to the extent that his formal schooling was limited to only a few weeks in the first and fifth grades. His early education, including most of high school, was under the guidance of his mother, who had been a school teacher.

In 1880, at the age of 14 years, he went to work as a cabinetmaker under the tutelage of a man whom he described as "the most skillful craftsman I have ever known in that trade." He continued at this work for seven years, until 1887. "At that period, the 1880's, the cabinetmaker was a real craftsman, although the use of machinery was coming in gradually, and was beginning to spell the deterioration of the trade."

During this period of apprenticeship, Roberts attended public evening drawing classes in Boston, and completed a three-year course in two years. Also, several summers were spent in outdoor work on a small fruit and vegetable farm.

Utilizing the knowledge and experience gained in the evening schools in Boston, early in 1887, he secured a position as draftsman in a large safe and iron works in Cambridge. This experience, and further attendance upon evening classes in Boston, led to his appointment, in September, 1887, as instructor in the School of Mechanic Arts, which had been recently organized under the leadership of Dr. John D. Runkle as a preparatory department of the Massachusetts Institute of Technology. This department was abandoned at the end of the school year, 1887–88.

Roberts came to know Dr. Runkle very well during this period, which was shortly before the latter was obliged to relinquish the presidency of the Institute because of ill-health, in 1888. "My memory is of a kindly, elderly gentleman, who manifested a deep interest in shopwork activities for boys. Later, I met him in his home, and visited the Brookline Manual Training School, which was a child of his endeavors."

During the school year, 1888–89, Roberts was a special student in shopwork at Massachusetts Institute of Technology, and in preparation for the entrance examinations as a regular student. The examinations were passed satisfactorily in the fall of 1889, and he devoted that year to further study at the Institute.

Beginning of His Teaching Career

At the opening of school in September, 1890, he was offered a position as principal of the West Manual Training School, in Cleveland, Ohio. He hesitated at first, but decided to accept the Cleveland invitation, partly at least because he needed to be earning an income. The decision to go to Cleveland seemed to him at the time an interruption of a plan upon which he had set his heart, namely, the acquisition of a college education. The decision was made with the full intention of returning, after a year or two of teaching, and the replenishment of his financial resources, to complete an engineering course.

This plan of acquiring an engineering degree was later abandoned, and it is instructive to note the considerations that were influential in bringing about the change of ambition. In Roberts' own words: "First, I soon became convinced that industrial teaching was the field of endeavor in which I wished to establish a life career. Second, the public schools of Cleveland, freed from objectionable political influences, offered an unlimited opportunity for the development of a program of handwork in public education. Third, no one technical school or college at that time offered a curriculum leading to a degree that would keep pace with the rapid developments in this field of educational endeavor. To drop out of active teaching for a year or more of study might even involve the risk of losing step with the march of progress. I did not see how I could hope to find elsewhere, even after further preparation, an opportunity for service any more attractive than that already opening up before me in Cleveland. I determined that the wisest course for me was to try to make myself equal to the demands of the rapidly expanding program immediately before me, and to try to grow with it. Thus, while directing the work in a promising field, I must seek inspiration, help, and guidance from many sources, instead of limiting myself to the offerings of any single institution."

The decision seems to have been amply justified by later events. Not only did Roberts "grow with his rapidly expanding program," he was soon recognized as one of the outstanding national leaders. The demand for higher qualifications for leaders in industrial education, in terms of more extended professional preparation and advanced degrees, came much later, as did also the provision of means for meeting these demands, in terms of organized curricula in teachers colleges and universities. And when institutions of higher learning began to inaugurate and develop curricula for the preparation of industrial-arts teachers and supervisors, Roberts played a prominent part and became one of the recognized leaders in this phase of the movement also.

A Deep-Sea Sailor

Before going further into Roberts' professional career, I must introduce here a brief reference to one of his hobbies. As a typical New Englander, he admits to a certain proportion of salt water in his make-up. In 1925 he acquired a modest summer home on Bustins Island, in Casco Bay, off the rockbound coast of Maine, about 15 miles north of Portland. Nearly every summer since that date, when the demands of school duties permitted, he has tried to spend at least a few days in rest and relaxation on the sea coast.

To aid in getting something more than just the tang of the salt sea and the feel of the offshore breezes, for the past 20 years or more he has played around with a seagoing boat the very sight of which would make any midwesterner from the prairie states want to hug the shore.

I recall that many years ago the old *Manual Training Magazine* published a vacation photograph showing Roberts at the helm of his "ship," quite evidently "having a wonderful time," with the hair which he had at that time blowing in the breeze, and not the sign of a care on his countenance. I am not enough of a mariner to identify the boat as a ketch, or a dinghy, a sloop, a yawl, or a yacht, but everything, so far as I could judge, looked seaworthy and shipshape.

There is another tale that could be told about Roberts' prowess as a deep-sea fisherman. But I avoid the risk of exciting credulity, or shall I say risibility, by not going into that subject.

Manual Training at Public Expense

To get back to somewhat less exciting matters, I note that I have already pointed out that the movement which we now know

as industrial arts does not own its inception to the wisdom, foresight, and initiative of public school superintendents and high school principals, or to the backing of farsighted boards of education. The beginnings were made by private institutions, and the initial experiments were made possible by associations of public-spirited men and women who subscribed the funds with which to erect and equip buildings, pay the salaries of teachers, and furnish the needed supplies. Not until these private experiments demonstrated the needs, and showed by example how the needs could be met, were public school officials and patrons stirred to action.

The experience in Cleveland was similar to that in certain other cities, except that a high school teacher actually took the first step. Beginning in February, 1885, Newton M. Anderson, a teacher of physics in Central High School, organized a class in carpentry for boys, meeting after school hours at first. Without any aid from the school, he arranged for the use of a barn in near-by Kennard Street, now East 46th Street. Interest in this experiment developed rapidly, and soon a group of businessmen organized and incorporated the Cleveland Manual Training School Company. A fund of $25,000 was subscribed, and a building was erected on East Prospect Street, now Carnegie Avenue, and named the Cleveland Manual Training School. A Committee representing the Company secured from the State Legislature the authorization of a special tax levy "for manual and domestic training for children in the city schools." The proceeds of the levy were devoted to the maintenance of the Cleveland Manual Training School, with the provision that Cleveland high school pupils were to receive instruction without payment for tuition.

When Mr. Roberts arrived in Cleveland, on September 17, 1890, therefore, a manual training program had been in operation for three or four years, under private direction and control. Mr. Roberts' assignment as principal of the new Manual Training School, to be operated as an Annex to West High School, was the beginning of manual training in Cleveland under the support and control of the board of education.

When Roberts arrived he discovered that no plans existed, and no preparations whatever had been made for starting the new school. The school was to be housed in the old West High School building at the corner of State Street, now West 29th, and Clinton Street, abandoned when the new West High School building was completed.

As may be readily imagined, the first few weeks were a trying time, devoted to the preparation of plans, the location of sources of equipment and supplies, the securing of approval of recommendations and requisitions, and the hasty assembling of rough woodworking benches and drafting tables, together with the requisite hand tools, instruments, and supplies.

The work of the first year consisted of instruction in benchwork in wood, and mechanical drawing, offered on an elective basis to pupils from the Cleveland high schools. Before the close of the first year, a second shop was equipped for instruction in wood turning and patternmaking, which, with advanced work in mechanical drawing, constituted the program for the second year. With the opening of the second year an assistant was appointed.

In preparation for the work of the third year, additional shops were provided and equipped for instruction in forging and machine-shop practice. In this manner there evolved a curriculum three years in length, open to volunteer pupils from the high schools. An innovation, quite rare in the 1890's, was the opening of classes for girls in benchwork and wood turning, which were well attended. With this exception the manual training work in Cleveland "differed only in minor respects from the traditional work of the period."

(To be continued)

Some Statements Prepared For The Vocational Teachers of Hesse, Germany

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(Continued from page 158 of the April, 1949, issue)

B. Vocational Education Briefs

1. *Some Reasons for Vocational Education*

1. Good vocational education is good economics and good sociology as well as good education. It is required for the highest level of democracy. It is a part of the total school program.

2. Vocational education means getting people ready and keeping them ready for useful employment. There are two distinct parts to a training program in any community or state. There must be good preparation before work begins. Later there must be additional training. Most employed men and women need help because their working conditions keep changing. A smaller number need assistance in learning new occupations because they cannot continue in their old ones.

3. No matter what kind of work a person does, he will do it better if he has been trained for it and has become well informed about it.

4. Special training increases the confidence and happiness of people. The man who knows *what* to do, *how* to do it, and *why* it should be done that way is a competent and contented workman. He is certain to take a better part in family and community life.

5. A trained person contributes more to the common good than a person without work preparation. He can more easily support himself and his dependents.

6. Vocational education raises the standard of living. If a person is not trained well he is not efficient. His lack of expertness raises the cost of the things that we buy. A poor workman makes his neighbors poorer because they must pay higher prices.

7. People need good wages. Employers cannot pay good wages unless they have good workmen. Training helps both employers and employees.

8. If boys and girls are well prepared for their work they will reach their highest earning levels sooner. This is good for them, their families, their communities and the State.

9. People who are not well trained often move from one type of work to another or from one employer to another. It is a demo-

cratic right to move about, but this shifting of laborers increases the cost of production and distribution.

10. One state competes with other states and one nation competes with other nations in the sale of farm and factory products. The state or nation that has the best trained workers has an advantage — a better chance for prosperity.

11. When workers fail to adjust to new jobs or to changes in their old jobs — when they become unemployed — we lose their purchasing power. Often we must actually support them and their families. They become a burden on the public, much like insane people and criminals.

12. Vocational training gives financial protection to the family, the community, and the state. Much money is spent on the general education of boys and girls in their early years. Unless we follow this general education with special preparation for work, there will not be a worth-while return on the first expenditure.

13. We have always provided good preparation for boys and girls who were planning to do professional or managerial work. We have not been fair to those who must serve us in other kinds of employment.

14. Taxes are collected from all of the people and should be used for the benefit of all of the people. We provide roads, bridges, public buildings, street lighting, and fire protection for everyone. We should provide good occupational preparation for everyone also.

II. *Some Requirements of Effective Training*

1. Provide training for all of the kinds of jobs and positions in which people work — *all* of the occupations of *all* of the people. This means training women as well as men, both youth and adults.

2. Place training facilities near where all of the people live — not confining it to large cities and to a few scattered towns.

3. Offer more and more school training for work, with apprenticeship being deferred to later years.

4. Give vocational preparation to those who will work *alone*, or in small groups, as well as to the workers in large companies.

5. Prepare young people to *begin* work and help them as they grow older, especially those who need help most.

6. Base the training program largely upon local opportunities for employment. This means that school administrators should study job surveys and data.

7. Make an analysis of each type of work for teaching purposes — to find out what a person must *know* and be able to *do* in order to get a job and hold it and progress in it.

8. Plan the training program through the co-operation of school officials, employers, and employees — taking account of the laws and regulations that control the work done and the conditions of employment in each field.

9. Conduct *evening* schools and classes for persons who work in the daytime, and *morning* classes for those who work through the night.

10. Provide good equipment and supplies — equal to those used in the regular practice of the occupation, in so far as practicable.

11. Train supervisors, such as foremen and masters, as well as the workers on the lower levels.

12. Give special training to those who are physically handicapped — from birth, through accident or by reason of war.

13. Do some of the training on a half-and-half time plan — earn and learn plan — alternating days, weeks, or months.

14. Insist upon high performance on the part of learners — good standards of both quality and speed.

15. Emphasize the technical information that is a part of each occupation. This becomes increasingly important.

16. Teach health and accident prevention in general and in connection with each occupation.

17. Teach more general or cultural subjects, especially the social sciences — history, geography, economics, sociology, and government.

18. Use only teachers who are occupationally competent. A person cannot teach what he does not know. Use persons who know *how to teach* and who will try to improve their methods of instruction.

19. Study the outcome of each training program so that it may become constantly more effective.

III. *Ninety Terms Used in the U. S. A.*

1. Administration — Industrial Education

Fluid administration
Flexible schedules
Curriculum influences
Vocational surveys
Occupational analysis
Geographic scatter
Field scatter
Day trade preparatory
Evening trade extension
Minor job training
General continuation
In — and out — students
Corporation school
Private or profit school
Endowed vocational school
Principal
Vice-principal
Local director
Local supervisor
Local teacher-trainer
Supervised apprenticeship
Co-operative half-time plans
Supervised correspondence courses
Advisory committees
Seeking groups to serve
State plan and aid
Federal aid
Foremanship
Technical institutes
Area vocational schools
Itinerant circuits
Dull season groups
Vestibule schools
Reservoir classes
Terminal junior colleges
State director
State supervisor
Co-ordinator
Call-staff instructor
Long term and short unit courses

2. Purpose — Industrial Education

Acquaintance
Exploration
Preparation
Job placement
Follow-up
Upgrading
Retraining
Rehabilitation
"Tapping the Hoop" education
"Pusher Engine" education

3. Teaching Types and Helps — Industrial Education

Lecture
Reading
Recitation
Demonstration
Drill
Conference
Question — Answer
Assignment
Whole class
Small group
Individual
Exercise
Project
Problem
Process
Operation sheet
Information sheet
Assignment sheet
Job sheet
Unit and lesson
Annual exhibit
Visual aids
Application charts
Plan of procedure
Interest factors
Class trips
Progress records
Routine
Testing
Grading
Pseudo job
Real job
Production plan
Quality standards
Time standards
Lecture and reading course
Controlled project course
Discussion course
State outline
Correlation

IV. *Parts of a Good Vocational Course (Written)*

1. A statement of the aims of the *school* in which the course is located

2. A statement of the aims of the *department or division* in the school in which the course is located

3. A statement of the aims of the *course* in question

NOTE: Unless the instructor is conscious of all *three* of the foregoing, he will not teach in a manner to attain the assumed outcomes.

4. A description or characterization of the students who will pursue the course — ages, general abilities, major interests, special needs, former schooling, knowledge of the subject

5. The number and length of class sessions, total hours in the course

NOTE: Unless the instructor is conscious of *both* of the foregoing, he will not proceed at the proper rate — will not omit the known parts — will not emphasize correctly — will not use proper time allocation for the several parts of the whole.

6. A list of manipulative things that are to be done by students as learning assignments — experiments, operations, processes, jobs, sketches, maps, etc.

7. A list of informational materials that are to be learned by students — scientific, mathematical, art and design, safety, social materials, guidance facts, job conditions, etc.

8. A list of discussion topics for students

9. A list of demonstrations by the instructor

10. A plan for students who are much more advanced than the average

11. The name of the textbook, if any, and a few good references

12. A list of special terms to be learned by students

13. A statement of the basic method of instruction to be employed

14. A statement of the class management scheme or plan

15. A list of visual aids to be used — slides,

films, models, charts, maps, parts of machinery, tools, instruments, etc.

16. A statement as to how the teacher will evaluate the work of the students and determine comparative grades

V. *Some Instructional Aids*

1. Books
2. Journals
3. Manuals
4. Scrapbooks
5. Charts
6. Films
7. Graphs
8. Samples
9. Displays
10. Exhibits
11. Mock-ups
12. Tests
13. Bulletins
14. Notebooks
15. Catalogues
16. Logbooks
17. Maps
18. Slides
19. Models
20. Panels
21. Collections
22. Blueprints
23. Cutaways
24. Instruments
25. Courses of study
26. Instruction sheets
27. Progress records
28. Blackboard work
29. Class trips
30. Raw materials
31. Lists of questions
32. Drill sheets
33. Analysis charts
34. Visiting speakers
35. Student competitions
36. Tools and parts

VI. *Twenty Social Goals of Vocational Courses*

1. Co-operativeness
2. Self-exploration
3. Self-discipline
4. Independence, initiative
5. Understanding of environment
6. Resourcefulness
7. How to follow directions
8. Accuracy and orderliness
9. Planning ability
10. Pride in craftsmanship
11. Importance of industry
12. Industrial geography
13. Occupational history
14. Consumer appreciation
15. Dignity of work
16. Attitude toward criticism
17. Respect for property
18. Value of time and materials
19. Work relationships
20. Job and community morale

VII. *Ten Errors in Vocational Teaching*

1. Helping students too much
2. Little use of visual aids
3. Little use of texts and references
4. Poor demonstrations
5. Tutoring rather than teaching
6. No variety in method
7. Assignments not definite
8. Standards not clearly set
9. Poor classroom routine
10. Lack of good management

VIII. *Good Professional Books in Industrial Education*

1. Allen, Hambrecht, and Welch, *The Instructor, the Man and the Job* (Philadelphia, Pa.: J. B. Lippincott Co.).

2. Bawden and others, *Industrial Arts in Modern Education* (Peoria, Ill.: Manual Arts Press).

3. Bennett, *History of Manual and Industrial Education* (Vol. I to 1870) and (Vol. II, 1870–1917) (Peoria, Ill.: Manual Arts Press).

4. Bollinger and Weaver, *How to Analyze and Organize for Teaching* (New York, N. Y.: Pitman Company, Publishers).

5. Cushman, *Foremanship and Supervision* (New York, N. Y.: John Wiley and Sons Co.).

6. Ericson, *Teaching the Industrial Arts* (Peoria, Ill.: Manual Arts Press).

7. Fryklund, *Trade and Job Analysis* (Milwaukee, Wis.: Bruce Publishing Co.).

8. Hall, *Trade Training in School and Plant* (New York, N. Y.: Appleton-Century Co.).

9. Hill and Ewing, *Materials and Methods for Vocational Training* (New York, N. Y.: McGraw-Hill Book Co.).

10. Lee and others, *Objectives and Problems of Vocational Education* (New York, N. Y.: McGraw-Hill Book Co.).

11. Mays, *Introduction to Vocational Education* (New York, N. Y.: Appleton-Century Co.).

12. Mays and Casberg, *School Shop Administration* (Milwaukee, Wis.: Bruce Publishing Co.).

13. Morgan, *Industrial Training and Testing* (New York, N. Y.: McGraw-Hill Book Co.).

14. Newkirk, *Integrated Handwork for Elementary Schools* (Chicago, Ill.: Silver-Burdett Company, Publishers).

15. Newkirk, *Organizing and Teaching the General Shop* (Peoria, Ill.: Manual Arts Press).

16. Prosser and Allen, *Vocational Education in a Democracy* (New York, N. Y.: Appleton-Century Co.).

17. Rakestraw, *Training High School Youth for Employment* (Chicago, Ill.: American Technical Society).

18. Selvidge, *How to Teach a Trade* (Peoria, Ill.: Manual Arts Press).

19. Selvidge and Fryklund, *Principles of Trade and Industrial Teaching* (Peoria, Ill.: Manual Arts Press).

20. Smith, *Industrial Education: Administration and Supervision* (New York, N. Y.: Appleton-Century Co.).

21. Smith, *One Thousand Problems in Industrial Education* (Minneapolis, Minn.: Press of the University of Minnesota).

22. Struck, *Vocational Education for a Changing World* (New York, N. Y.: John Wiley and Sons Co.).

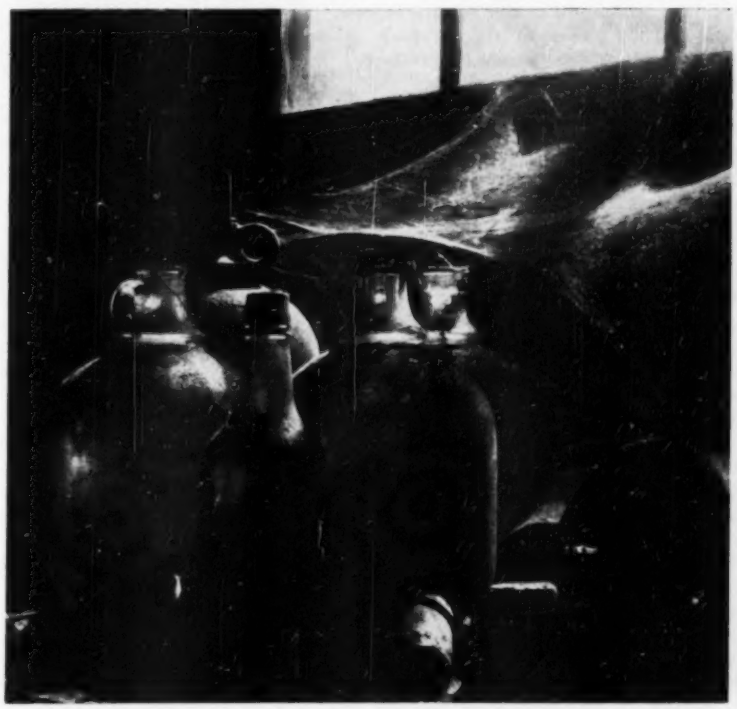
23. Struck, *Creative Teaching: Industrial and Vocational* (New York, N. Y.: John Wiley and Sons Co.).

24. Williams, *Exploring the Arts and Industries* (Chicago, Ill.: International Textbook Co.).

25. Wright and Allen, *Efficiency in Vocational Education* (New York, N. Y.: The Wiley Company, Publishers).

NOTE: In connection with the formal report on the three-month assignment, certain materials were left for use and many selected bulletins and articles were listed.

(To be continued)



This picture, "Spider Webs," taken by Ralph J. Varde, Roosevelt Senior High School student, Chicago, Ill., was awarded a Second Prize of $50 in Class III — Scenes and Still Life — in the Third Annual 1948 National High School photographic awards

Industrial Arts and Vocational Education
John J. Metz, Editor

THE TEACHER'S VACATION

The May issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION is the second last number for this school year. That means that vacation days are close at hand, and that it is necessary for industrial-arts teachers to plan just what they want to do with the vacation which will soon be upon them.

Some, of course, will choose to avail themselves of opportunities offered to earn money with which to augment the salaries earned during the school year. By so doing, they have a chance to study advances made by industry, and to become acquainted with men actually working with the tools and materials that are used in the school shop. It is an excellent way of spending part of one's vacation, because the change of environment and the making of new acquaintances is quite different from the teaching of classes during the school year.

Others will spend their time touring, or at the lakes, or in the mountains, fishing and hiking. No one will deny that this is a most ideal way in which to recuperate and lay up extra strength for the coming school year.

Still others will enjoy the healthful change from teaching in the school shop to teaching in the open as camp leaders or instructors. This method of spending a vacation is to be highly recommended as it combines engaging in a worth-while activity with all of the advantages of living at a summer resort.

And then there are those who are anxious to advance themselves professionally by attending summer school. To help those who have not as yet made a choice of the institution which they wish to attend, a short list of universities offering summer schoolwork in industrial arts and vocational education, is given herewith. They are listed according to the states in which they are located so that they can be more easily referred to.

Writing to the director of summer sessions of any of the institutions mentioned will bring the required information to the inquirer.

California: University of Southern California, at Los Angeles 7, Calif.
Colorado: Colorado A. & M. College, at Fort Collins, Colo.
Illinois: Bradley University, at Peoria 5, Ill.
Michigan: Wayne University, at Detroit, Mich.
Minnesota: University of Minnesota, at Minneapolis, Minn.
New York: Cornell University, at Ithaca, N. Y.; State Teachers College, at Oswego, N. Y.
Oregon: Oregon State College, at Corvallis, Ore.
Pennsylvania: The Pennsylvania State College, at State College, Pa.; State Teachers College, at California, Pa.
Texas: Texas A. & M. College, at College Station, Tex.
Wisconsin: The Stout Institute, at Menomonie, Wis.

The question of summer schools and summer school attendance should not be overlooked by young teachers. The matter of collegiate degrees is gaining increasingly greater importance, and the teacher's best bet, when advancement offers, depends upon having the proper degree at the right time. It is best then to get advanced degrees as soon after securing the first teaching position as possible. Then, too, attending summer school sessions can easily be coupled with interesting travel and sightseeing. A glance at the list of colleges shows that some of them are located in very interesting parts of our country. One can easily combine a wonderful vacation trip with attendance at summer school.

THE STUDENT'S VACATION

This is the time to precondition your students for the freedom which they will enjoy during the three months of vacation which will soon begin. These youngsters do not have enough judgment to avoid the many dangers which lurk in the most unsuspected places ready to catch the unwary.

Among some of the items that your students are to be preconditioned and warned against are the following:

Avoid overexposure to the sun's rays. Very painful burns may result which may take weeks before they heal, thereby spoiling an entire vacation period. Don't take a nap in the sun.

Not all berries are good to eat. Know what kind of berries you are sampling. The berries may look luscious, but they may contain enough poison to make you very sick, or even cause your death.

Be careful of coming in contact with poison ivy, poison oak, poison sumac. The results from indiscreetly handling these plants can be very painful and troublesome.

Use the utmost caution when crossing and walking on the highways.

Swimming and diving is great fun. Know where to indulge in it, however. Many children lose their lives during the summer months just because they overtax their strength while swimming, or while diving into water that is too shallow, or that contains hidden obstructions.

Avoid drinking polluted water.

Forest fires are dreadful and cause great damage every year. Guard your campfires and be careful with your matches and your cigarettes.

Don't rock the boat is an old admonition, but it is still good, and should be strictly observed. If you fall overboard, climb in over the stern, not over the side. When you go out in a boat, take a life preserver along.

Be careful not to spill gasoline in the boat when you fill the gasoline tank for the engine. Dangerous fires have been started that way.

Climbing trees has a great attraction for the young; that is why so many are crippled or killed when branches break, or accidental falls occur. It is better not to climb them.

Don't fly kites near electric wires. Annually children are electrocuted that way. Wet kite strings may conduct sufficient electricity to cause death. Above all, don't use metal wires on your kites.

Nonobservance of any of the foregoing admonitions may not be followed by fatal results, but observance of them will insure a chance to spend another vacation next year.

REQUISITION TIME

In thinking about the materials and supplies that you will need for the next school year, do not forget to determine whether there are repairs and alterations that need to be made. Such work requires material, too, or it may require that outside workers must be hired. At any rate, a description of what must be done, and requisitions for the material that may be needed must be made out and given to the person whose duty it is to make decisions on how much of this work is to be done, and by whom.

Remember it is your shop, and your interest in it ought to be such that you will take the initiative in seeing that it is kept in good condition.

Aiding the Diversified Occupations Student to Adjust to His Job

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(*Concluded from page 155 of the April, 1949, issue*)

Unit. 4. What Personal Habits and Attitudes Will Help Me Be Successful?

I. Objective: To understand the necessity for developing habits and attitudes that will lead to success.

II. Read the following references before proceeding further:
- A. Author: Wheatley and Mallory
- B. Title: *Building Character and Personality*
- C. Pages: 182, 198–210
- A. Author: ZuTavern and Bullock
- B. Title: *Business of Life*
- C. Pages: 151–167

III. Answer the following questions on a separate sheet of paper:
1. Make a list of the habits and attitudes you have that may be detrimental to your progress.
2. How can one attempt to break a bad habit? (Give example.)
3. In what way is our character affected by the habits we form?
4. Explain the chart on page 182 of the reference by Wheatley and Mallory.
5. Compare yourself with the chart on page 205, Wheatley and Mallory.
6. Make a list of personal habits and attitudes that you should develop.
7. What is one way to remember names?
8. What is the only real handicap that may prevent success?

IV. Before having your answers checked by your instructor, check them yourself.

Unit 5. What Habits and Attitudes Will Interfere With Success?

I. Objective: To learn to recognize the attitudes and habits that will interfere with becoming a dependable individual in society.

II. Read the following references before proceeding further:
- A. Author: Crabbe and Salsgiver
- B. Title: *General Business*
- C. Pages: 139–167
- A. Author: Nichols
- B. Title: *Junior Business Training*
- C. Pages: 190–193, 205–210

III. Answer the following questions on a separate sheet of paper:
1. In addition to time, what can be so easily wasted that its loss is scarcely noticed?
2. Make a list of habits and attitudes that you recognize in someone you know which are detrimental to his success.
3. Why is it necessary for emotions to be controlled?
4. Make a self-appraisal based upon the following emotions and attitudes: jealousy, anger, laziness, carelessness, untidiness.
5. What habits or attitudes do you have that cost you in terms of: (1) money, (2) time, (3) energy?
6. Why is it important to develop the habit of being thrifty now?

IV. Before having your answers checked by your instructor, check them yourself.

Unit 6. Handling of Money

I. Objective: To learn the value of money and the care that should be taken in business transactions.

II. Read the following references before proceeding further:
- A. Author: ZuTavern and Bullock
- B. Title: *Business of Life*
- C. Pages: 36, 41–46, 54, 66, 111, 143, 390–401

III. Answer the following questions on a separate sheet of paper:
1. What determines the buying power of money?
2. What are the four essentials of good money?
3. Give examples of the method used for making change in the place where you work.
4. What is a traveler's check? Do you cash it? Explain method.
5. What is a personal check? Do you cash it? Explain method.
6. What is a postal money order? Do you cash it? Explain method.
7. What is an express money order? Do you cash it? Explain method.
8. What is a bank draft? Do you cash it? Explain method.

IV. Before having your answers checked by your instructor, check them yourself.

Unit 7. Social Security

I. Objective: To learn the provisions of the Social Security Act with emphasis on those divisions directly affecting the young worker.

II. Read the following references before proceeding further:
- A. Author:
- B. Title: *The World Almanac, 1947*
- C. Pages: 405–407

III. Answer the following questions on a separate sheet of paper:
1. When did the Social Security Act go into effect?
2. How do you get a Social Security card?
3. How do you replace a lost card?
4. How can you check on your wage credits?
5. What percentage of your wages is deducted for Social Security?
6. What groups do not come under Social Security?
7. Where can you go to receive help or information regarding Social Security?
8. What two kinds of benefits can be received?
9. What is the maximum benefit to be received?
10. How do you receive benefits from Social Security?
11. What is the retirement age?
12. Social Security Taxes apply to one's salary up to .....?

IV. Before having your answers checked by your instructor, check them yourself.

Unit 8. How to Apply for a Job

I. Objective: To learn the fundamental principles underlying a personal application for a job.

II. Read the following references before proceeding further:
- A. Author: Prosser and Anderson
- B. Title: *Information Book on Getting a Job*
- C. Pages: 1–50

III. Answer the following questions on a separate sheet of paper:
1. Make a list of prospective employers.
2. Select a prospective employer. (a) Give reason for your selection.

3. Who is the personnel manager, or whom do you contact for the job you have selected?
4. List information about yourself.
5. What personal qualities and skills have you to sell?
6. List the things you should keep in mind when making a personal interview.
7. List things you should keep in mind when closing the interview.

IV. Before having your answers checked by your instructor, check them yourself.

Unit 9. How to Select an Occupation

I. Objective: To learn the things that should be taken into consideration when selecting an occupation.

II. Read the following references before proceeding further:
A. Author: ZuTavern and Bullock
B. Title: *Business of Life*
C. Pages: 1–20, 309–318, 319–322
A. Author: Nichols
B. Title: *Junior Business Training for Economic Living*
C. Pages: 305–313

III. Answer the following questions on a separate sheet of paper:
1. List several part-time jobs in which you are interested.
2. What is your parents' advice regarding your choice of occupation?
3. With whom have you talked about your job? (*a*) Why did you select this person? (*b*) What was the advice received?
4. What are your achievements up to the present time? List them.
5. Talk with someone who is now employed in the occupation of your choice. (*a*) Name. (*b*) What is his position? (*c*) What was advice received?
6. Consult your co-ordinator for additional information.

IV. Before having your answers checked by your instructor, check them yourself.

Unit 10. Habit Formation

I. Objective: To learn how to form good habits and to understand the value of good habits with relation to a job.

II. Read the following references before proceeding further:
A. Author: Wheatley and Mallory
B. Title: *Building Character and Personality*
C. Pages: 198–209
A. Author: Nichols
B. Title: *Junior Business Training for Economic Living*
C. Pages: 205–207

III. Answer the following questions on a separate sheet of paper:
1. What is incidental learning?
2. What is its value?
3. Name the steps in forming a habit.
4. How can you break an undesirable habit?
5. How do you form any habit?
6. When is the easiest time to form a habit?
7. Explain how habits save us an immense amount of time and trouble. Give instances.
8. How is our character affected by the habits we form? What useful cautions or suggestions can you give?

IV. Before having your answers checked by your instructor, check them yourself.

Unit 11. Selling Yourself

I. Objective: To learn the value of self-adjustment and the requirements for becoming a well-integrated individual.

II. Read the following references before proceeding further:
A. Author: ZuTavern and Bullock
B. Title: *Business of Life*
C. Pages: 1–20
A. Author: Nichols
B. Title: *Junior Business Training for Economic Living*
C. Pages: 1–14

III. Answer the following questions on a separate sheet of paper:
1. What are some of the things which you can do now that will help you to become a "salesman of self"?
2. What are your weaknesses?
3. How can you strengthen your weakest qualities?
4. How can you develop self-esteem without becoming egotistical?
5. What can one do to become well poised?
6. List the specific things you can do to sell yourself to your friends, your employer, and strangers.
7. What is meant by high energy? Low energy?
8. What is your debt to society?

IV. Before having your answers checked by your instructor, check them yourself.

Unit 12. Taxes

I. Objective: To learn the need for taxes, the various taxes levied in this community, and the use of tax monies.

II. Read the following references before proceeding further:
A. Author: Crabbe and Salsgiver
B. Title: *General Business*
C. Pages: 367, 666–667, 659, 672
A. Author: ZuTavern and Bullock
B. Title: *Business of Life*
C. Pages: 579

III. Answer the following questions on a separate sheet of paper:
1. What is a tax?
2. Define the following types of taxes: inheritance, excise, tariff, luxury, real estate property, personal property, income, sales.
3. What taxes are withheld from your pay check?
4. How are the departments and agencies of the federal, state, county, and city governments financed?
5. List the services in your community that it would be impossible to have without tax monies.

IV. Before having your answers checked by your instructor, check them yourself.

Unit 13. Wage Hour Law

I. Objective: To learn the provisions of the Wage Hour Law (Labor Relations Act).

II. Read the following references before proceeding further:
A. Author:
B. Title: *World Almanac, 1947*
C. Pages: 416–417
A. Author: Nichols
B. Title: *Junior Business Training for Economic Living*
C. Pages: 627

III. Answer the following questions on a separate sheet of paper:
1. What are the principal objectives of this law?
2. What is the minimum hourly wage provided by this law?
3. What is the maximum number of hours that can be worked before payment of overtime must be made?
4. List three industries in St. Joseph, Mo., that would be specific exemptions from overtime provisions.
5. What is the minimum age of part-time employees?
6. List the requirements other than age that must be met for 14- and 15-year-old employees.
7. List the exemptions from the child labor provisions of the act.
8. How does the act affect you on your present job?

IV. Before having your answers checked by your instructor, check them yourself.

Unit 14. Insurance

I. Objective: To learn to understand the purpose of insurance and to become acquainted with available insurance plans.

II. Read the following references before proceeding further:
A. Author: Nichols
B. Title: *Junior Business Training for Economic Living*
C. Pages: 373–383, 384–389
A. Author: ZuTavern and Bullock
B. Title: *Business of Life*
C. Pages: 352–353, 355
A. Author: Crabbe and Salsgiver
B. Title: *General Business*
C. Pages: 341–364

III. Answer the following questions on a separate sheet of paper:
1. Define: term insurance, ordinary life insurance, limited payment insurance, endowment insurance, annuity insurance, group insurance.
2. What type of policy would be best for you at the present time? Give reasons.
3. What is the usual budgetary figure given for insurance?
4. What are the two purposes of life insurance?
5. What is meant by cash surrender value?

6. What is meant by loan value?

IV. Before having your answers checked by your instructor, check them yourself.

Unit 15. Employer-Employee Relations

I. Objective: To learn how society regulates certain relations between employers and employees.

II. Read the following references before proceeding further:
   A. Author: Crabbe and Salsgiver
   B. Title: *General Business*
   C. Pages: 691–693
   A. Author: Nichols
   B. Title: *Junior Business Training for Economic Living*
   C. Pages: 621–627

III. Answer the following questions on a separate sheet of paper:
   1. What is the chief purpose of the National Labor Relations Act?
   2. What are the results of labor disputes from the point of view of the community?
   3. Name local companies that provide opportunities for additional training of their employees.
   4. Who is responsible for safety in a place of business?
   5. Name several companies that make it possible for employees to participate in group insurance.
   6. What advantages does the company for which you work make available to you?
   7. What are your obligations to the company for which you work?

IV. Before having your answers checked by your instructor, check them yourself.

Additional lessons in the same area will undoubtedly need to be developed by the co-ordinator in order to meet the needs of his students. The success in practice of these or any set of lessons depends on how they are used. The co-ordinator must study carefully the individual and his problems, selecting lessons which will meet needs at the time when they are felt.

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Upgrading Vocational Teachers

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Directors have many duties to perform in carrying out the responsibilities of their position. Some of these duties are administrative in character while others are supervisory.

Since the administrative tasks seem more pressing there is a tendency on the part of some to confine their efforts to that phase of their work and to ignore their supervisory functions.

One of these supervisory responsibilities has to do with the upgrading of the teaching staff. It is the purpose of this discussion to indicate certain methods by which the director may become active in the process of upgrading his teachers. It is not suggested that these are the only actions that he may undertake. Nor is it felt that they are the most important. It is believed, however, that they offer suggestions that the director may find helpful.

Teachers' Meetings

The teachers' meeting may be made an effective agency in the upgrading of teachers.

If this is to be achieved the director must have some definite business to take up with the teachers each time a meeting is called. This business should be of general interest to the whole group. The time of the whole group should not be taken up with matters of interest only to individual teachers.

Each meeting should have a specific purpose and that purpose should be clear to each one attending.

There should be an agenda for each meeting and it should be in the hands of the teachers a few days prior to the meeting in order that they may have an opportunity to prepare themselves to participate in the discussions.

The purpose of a meeting may justify calling all teachers together or it may necessitate the calling together a small group.

Attending teachers' meetings when called is definitely a part of the teachers' job. As such they have a right to expect that they shall be held during school hours. This involves a problem of scheduling; however, if the meeting is as valuable as it should be, an adjustment of the regular class schedule can be justified.

Teachers' meetings may be used in different ways to upgrade teachers. Among these are the following:

a) They may be used as an avenue through which the director may inform the teachers concerning his over-all plans.

b) Teachers who have developed a new method or a new project may be given an opportunity to demonstrate before the group.

c) They may be used as a forum in which problems of common interest rising out of the work of the department may be discussed. This stimulates the teachers and brings to the director the best thinking of his whole staff.

Aid Teachers in Developing Objectives

When one starts out on a trip it is customary for him to have an objective. Similarly, a teacher who is responsible for a class should have objectives toward which he works.

After these objectives have been determined everything he does with his class should be planned in such a way as to bring him nearer to the thing he is aiming at.

The director must assure himself that each of his teachers has desirable objectives in mind, or he must assist them to develop them.

Then too, he must assure himself that the objectives are uniform for similar work throughout the school system.

The process of this development does not involve lecturing on the part of the director, nor is it the unloading of the director's ideas on the teachers. It means merely that the director acts as a leader in harmonizing the ideas of the group.

The aim of such a discussion is to develop a series of objectives to which all will subscribe, and which all will strive to achieve.

Aid Teachers in Developing Courses of Study

There are different ways in which a course of study may be set up.

1. The director finds a course of study he likes and he insists that his teachers follow it.
2. Each teacher may prepare his course of study independently and without any consideration of what is being covered by other teachers in the same subject.
3. A committee is made up of all teachers in the area for which a course outline is required.

The course of study in any subject should be designed for the whole school system.

It should not be a series of independent units prepared by the various teachers.

It is the responsibility of the director to appoint a committee made up of all teachers in the school system who teach in the field for which the course has to be prepared.

The director need not be intimately acquainted with the field from which the members of the committee come. It is his function to draw out ideas, harmonize differences of opinion, and assist in the task of setting up the suggestions in a usable form.

Stimulate Teachers Into Meeting Qualifications

If the local community is to be reimbursed for the salary of a teacher it is necessary that he meet the qualifications set up under the state plan.

Since this is true it is necessary that a director assure himself that each of his teachers is approved. In order that he may do this he should keep a record of the standing of each teacher. This should enable him to determine what each teacher has yet to do. Having done this he should assume the responsibility of selling the teacher on the idea of self-improvement.

Finally, he should arrange matters in such a way as to make it possible for the teacher to meet the requirements.

Encourage Professional Reading

One method of keeping teachers informed concerning developments in their field is through the reading of the related material published in our professional books and magazines.

The director can promote study of this kind by:

1. Bringing to the attention of each teacher the new books that appear dealing with matters pertaining to the teacher's field.
2. Asking for an opinion on the merits of each book.
3. Bring to the attention of each teacher the current magazine articles dealing with the teacher's field.

This means that the director must be alert to what is being published in the various areas under his direction. Obviously, he could not personally read all that is published, and it is more than likely that much of it would be too technical for him to understand. However, it is his responsibility to know what is new in the literature and to bring to the attention of the teachers in each area items in which they may be interested.

Provide Opportunities to Keep Up to Date

We live in a changing world. Materials change, equipment changes, and methods of manufacturing as well as methods of teaching are constantly changing.

The teacher must keep abreast of these changes if he hopes to function as a leader in his field. If he is to do this, opportunities must be provided for observation and experience. It is the director's responsibility to arrange for those:

1. Provide visiting days.
2. Encourage working during vacation.
3. Arrange for interschool visits.

Encourage Teachers to Write for Professional Magazines

One measure of a teacher's standing in his profession is the extent to which he has contributed to the literature in his field. This does not mean necessarily that he must write a book. As a matter of fact, he may be quite mediocre as a writer. What really counts is, "Does he have ideas?"

If he has, and can present them in a form that can be understood, he will find that magazine editors can usually arrange to have the article rewritten with full credit being given to the original author.

Most teachers, even the less competent among them, have something to offer which is of general interest. It is the responsibility of the director to encourage these men to write about these things. They might even go as far as to assist them in their efforts. Every article that is published gives satisfaction to the author; it increases his prestige among his associates; and develops a feeling within him that he has made some contribution to the field in which he is engaged. Added to this it raises the professional standing of the author; it is a means of spreading good ideas throughout the country and, incidentally, both the director and his department enjoy the reflected glory that comes from a member of the staff being recognized in a professional magazine.

(To be continued)

Living in a Dynamic World*

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We are living in a world today that provides us with the greatest assortment of articles that has ever been known to mankind. We are not only producing far more than our grandparents had ever dreamed of, but, strangely enough, we are producing it in the shortest possible time.

Now let us consider a few of the changes this mass production has brought about in our way of life. In the first place, it has given us an abundance of leisure time. The normal working week has shrunk from 70 hours to 40 hours during the past century. In other words, we now have 30 hours less per week to spend at our daily work. And this, in turn, means that we now have 30 additional hours per week to spend in leisure time activities.

We also have vacations which usually extend over a period of two or three weeks each year. Then, too, there are a great many holidays which take us away from employment. People retire at a much earlier age than they did several generations ago.

We must not forget that many labor-

*A radio broadcast by the author over station WDRC, Hartford, Conn., Dec. 4, 1948.

saving devices in the home and elsewhere provide us with additional hours for recreation and hobbies. Our system of transportation and communication have been improved so that we are spared much time and energy every day. The fact that we can purchase almost everything ready-made, saves us many laborious hours which were spent by our grandparents in providing the necessities of life. So, you see, we are really living in an age of leisure.

Paradoxical as it may seem, idle hands and idle minds present a problem to society. Juvenile delinquency goes hand in hand with undirected idleness. The alcoholic, the neurotic, and the criminal are, to a large extent, the product of idleness which lacks guidance and direction. Boredom and social decay follow in its wake.

Worthy Use of Leisure

What can be done to offset the harmful effects of an overabundance of leisure time, for it seems to be with us to stay? What can we do to relieve the nervous tension which was formerly dissipated through physical fatigue, resulting from long hours of employment? How can one escape into a more congenial world than that which we find in many of our present vocations?

Modern society places emphasis upon group-mindedness. Today, in nearly all spheres of activity, we are constantly rubbing elbows with our fellow man. Consequently, it becomes quite necessary for us to learn the art of "enjoying people."

As the complexity of our modern civilization increases, we find ourselves being thrown more and more into contact with varying personalities. From the "laissez-faire" individuality of an earlier age, we have been moving speedily and steadily to the interdependence of today.

As recently as a hundred years ago, ours was an agricultural world. The basis of society was the farmer, working 12 hours or more a day in a rather solitary fashion, barely seeing even his family excepting at meals, and for an hour or so in the evening. Little need had he for the ability to find comfort and joy in the presence of other people, little use could he have made of this ability, for everyone else was just as busy, just as alone. Contrast this with your life today. You spend 40 hours a week, not alone in the fields, but as one of the gang in office or factory, part of a team; all of whom come in frequent contact with you. When work is over, exhaustion and lack of company no longer force you straight to bed, but instead you have an evening for leisure — a meeting of the club — a game of poker with the "boys" — a movie with the little woman — or the adventures of Ichabod the field mouse with the kiddies.

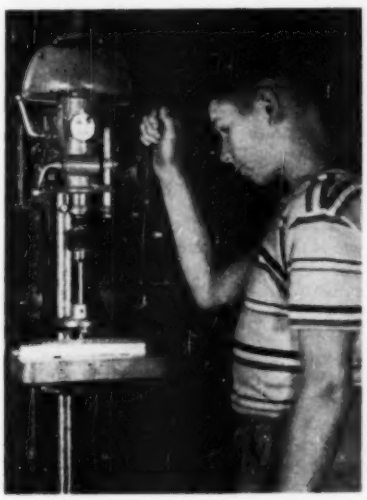
All your life, workdays and holidays, weekdays and Sundays is inextricably tied up with the lives of others. How now can one find enjoyment in life if not through enjoyment of the personalities and problems of other people? Your associates, individually and collectively, have become the dominant factor in your own life, so why not learn to enjoy them? Your contacts with others can be dull or exciting, distasteful or enjoyable, as you desire, so why not make the most of them?

It has been estimated that the average person spends a minimum of from 6 to 10 hours a day in direct contact with other people. If you can make these hours happy hours, you will have gone a long way toward making your life a happy life.

How then can we make these hours happy and profitable? Just what can you do to get the most enjoyment out of the people around you? Is there a magic formula?

Although the answers to these questions lie mainly in yourself and in your determination to find those answers, the fact remains that there is a magic formula. Not a panacea, not any effortless cure-all; but a formula which applied with sincerity, diligence, and confidence, will go a long way toward answering these vital questions.

In brief, the way to enjoy people is to become interested in them. No matter who he may be, or what his station in life, your neighbor has many truly fascinating traits and interests, many things he can teach you, many joys he can share with you. His job has its points of interest, be it digging ditches or managing a huge corporation. His hobby can be fascinating, whether it is collecting bugs or analyzing the lives of statesmen. No matter how dull and commonplace he may seem to the casual onlooker, the person who strikes up an acquaintance will find his interest well repaid by a veritable gold mine of fascination. Why not try it sometime? You'll never regret it.



Working on the drill press. Submitted by Franklin H. Gottshall, Boyerstown, Pa.

This enjoyment of other people, however, vital though it may be, is not the only thing in life. You are still faced with the problem: What about the rest of your leisure time?

Mental Health and Leisure

Ironical as it may seem, even though we have a great deal of time on our hands, we Americans have geared our lives to high speed. We have lost the art of being leisurely in our daily living. We rush hither and yon, trying to get there in the shortest possible time and then we double our efforts for a speedy return. Day after day, our lives are crowded with activities that keep us in a perpetual state of exhaustion. Instead of taking a quiet trip during our week-end vacations, we take a peculiar pride in boasting about the distance we have traveled in so short a time. Do we not have an increasing rate of traffic accidents to bear out this fact?

Our inability to use this increased leisure time wisely, so as to release our pent-up nervous tension has had a serious effect on our mental health. It is estimated that well over 8 million persons in the U. S. today are suffering from mental disorder. Psychiatrists tell us that at least one out of every 20 persons will require some type of psychiatric care during their lifetime. What's more, they also tell us that nearly all persons who are mentally ill are the individuals who have had a narrow range of interests.

So vital is this problem of mental health, that the National Mental Health Act was passed by our United States government in 1946. This legislation is aimed primarily at preventing mental illness. Millions of dollars are being spent under this act each year for research in the field of mental health, for the training of personnel, and for the setting up of preventive mental health programs in local communities. Emphasis is placed upon the release of one's creative and productive powers in order that sound mental health may be enjoyed.

It seems fair to assume that the program which has been effective in curing mental

illnesses might also be effective in preventing such ailments. Thus we find that recreation and hobbies play a big part, because of their inherent therapeutic value, in preventing mental disorders.

Now why do we recommend hobbies as a release from the nervous tension which plagues us today? Because hobbies are interesting. They are fascinating. They take us away from the worries of the world. When we enter wholeheartedly into the sports of "hobby land" we develop a new zest for living. When we meet others who are riding the same hobby horse, we enter into a new world of common interests.

If I were to ask you the meaning of the word "hobby" you would have a variety of answers. To some of you, it means engaging in an activity which enables you to be creative. To others it expands the horizons of the vocations which they follow in their daily life. Many people regard hobbies as being purely recreational. For some people, it satisfies their urge to collect. Still others engage in these activities because they know they are high strung, because they have a nervous temperament, and because they cannot sleep at night due to worries and anxieties.

However, we are not interested primarily in the reasons for engaging in a hobby. We would rather stress the importance of using this means as an escape from the nervous tension which accompanies life in today's dynamic society. The tedium of the factory worker and the mental strain of the professional man must find activities which will be soothing and restful. How else can he keep from reaching the *breaking point*, for psychiatrists tell us that all of us have a *breaking point*. Those of us who drive ourselves beyond this breaking point, become mentally sick.

Selecting the Right Hobby

People who wish to take up a hobby will immediately ask one question: "How can we select the right hobby?" The answer is simple. Select any activity which is socially approved and which gives you a great deal of happiness; then enter into it to the extent of your heart's desire. Remember: you will get just as much out of it as you put into it. If you invest only a little of yourself in your hobby, you will receive very slight returns.

It is quite natural for one to have a number of hobbies. Also, to change from one type to another. These activities need not be done on a definite schedule and with a definite goal of production in mind. That would take all the joy out of it and then it would no longer be a hobby. One should engage in them in a leisurely fashion just as long as they yield enjoyment. A person who is trying to create something out of wood, or clay, or leather and yet keep his eye on the clock for "quitting time" can hardly be called a hobbyist.

There are a great many agencies that make recreation and hobbies available, or in many cases, that provide the background for engaging in these activities. The Y.M.C.A., the Y.W.C.A., the Boys Clubs of America, the Boy and Girl Scouts, and the Social Centers offer many opportunities. Numerous local communities have elaborate recreational centers. Departments of adult education offer a wide variety of areas. Then, too, we have the many private clubs — hundreds of them — a club for almost every hobby. Of course you do not need to be a member of a club or an organization to maintain sound mental health by engaging in hobbies. We must remember that many collectors and craftsmen do not belong to any of these organizations.

However, we cannot stress the maintenance of sound mental health without considering the educational background which we provide for our children. Emphasis must be placed upon the program of industrial arts for it provides very definitely for carrying out creative hobbies in later life. In it, the child learns to create things in wood, in metal, in plastics, in textiles, in clay, and in leather. He learns to set up type and to print cards and programs. He learns to apply the theories of electricity by making many electrical gadgets. He learns the inner workings of the automobile engine and other types of power plants. He learns to do many things about the home which will be useful throughout his entire life. The industrial-arts program prepares him specifically for one of the cardinal principles of education; namely, the worthy use of leisure. Preparing the youth of today for this abundance of leisure time has become one of education's foremost responsibilities.

Industrial-arts training, however, is but one of the many wholesome activities which should be made available to children in schools. There are many others but time does not permit a consideration of all those that play a part in shaping the minds and lives of our people. We can only point out that sound mental health is not attained simply by talking and reading about it. It is a *way of living* and children must learn sound mental health practices by living them every day.

But how can children be taught to live in the hubhub of an industrial civilization in classrooms which are pathetically overcrowded and in school buildings which were antiquated generations ago? How can they be given the best when there is a great shortage of qualified teachers in our elementary schools? How can we prepare them for life in a dynamic world?

The answers to these questions are quite simple. First, we must greatly increase the number of qualified teachers so that classes will not be overcrowded. Second, we must abandon those antiquated buildings and provide physical plants that make possible a modern program of education. Third, we must improve our salary schedule so that the finest personalities will be attracted to the teaching profession. And lastly, we must enrich our curriculum so that children can engage in activities that are conducive to sound mental health.

HOW MUCH DO YOU KNOW ABOUT LUMINESCENCE?

Do you know that there are luminescent paints, paper, plastics, and printing inks that require no radium or radioactive material to make them glow in the dark? In these new materials the luminescent glow is produced by a special pigment which has the ability to absorb light energy.

If the luminescent material glows only during the time that it is exposed to a "black" light, it is called *fluorescent*. If it continues to glow *after* the exciting light is removed or extinguished, this luminescent glow is known as *phosphorescence* which, because it continues after all exciting lights are removed, is also called the *afterglow*. The latter is often called "luminous," and is the type that glows in the dark after exposure to daylight, lamplight, or black light.

For those who are technically minded, it may be of interest to know what causes these pigments to luminesce, or glow. The scientific theory is that the electron is forced out of its normal position in the molecule by the energy from ordinary light — black light, daylight, or ordinary lamplight. When the electron returns to its proper place, this energy is converted into light of a different color. Billions upon billions of electrons in motion at the same time produce a visible glow which is called "luminescence." — *The New Jersey Zinc Co.*

We all talk so much about the material benefits which we have achieved in this country that I think we may sometimes forget that our accomplishments stand on a religious foundation. Any future accomplishments must stand on the same ground. We can't hope to do anything significantly new unless we work toward high purposes — unless we keep a sound balance between the material and the moral.—*Benson Ford.*

Problems and Projects

REVOLVING SEESAW

HOWARD R. JUNKER
Industrial Arts Instructor
Chappaqua, N. Y.

Here is just the project for a general shop to utilize small pieces of pipe, or perhaps you, too, have a few kiddies at home who would enjoy a real usable toy their dad made for them!

1. Cut four pieces of ½-in. pipe to a 4½-in. length with either a pipe cutter or a hack saw.

2. Put a ½-in. NPT die in a stock and cut a thread on one end of each piece for a distance of about ¾ in. Smooth other end with a file.

3. Screw these parts into the ends of the ½-in. T's which are part No. 2.

4. Cut and thread on both ends for about ¾ in., two pieces of ½-in. pipe about 4 in. long. The length of this No. 3 part may vary according to the thickness of the plank you are using. You may also vary the length of the planks according to the size of the children who may be riding the seesaw.

5. Bore two holes 14/16 in. in diameter and centered about 18 in. from the ends of the plank. (By having a fairly large distance here lighter children may sit out toward the end of the board and heavier ones closer to the handle to compensate for inequality of weights.

6. Just barely fit a part No. 5 nut on one end of pipe No. 3 and insert into holes just cut. The nut is to be on the bottom.

7. Slip a ¾-in. coupling over the No. 3 part on the opposite side of the board and then screw on the handle subassembly of parts 1 and 2.

8. Thread a piece of ½-in. pipe 5 in. long for ¾ in. on both ends, to make part No. 9.

9. Take a ½ by ½ by 1-in. T part No. 8 and either file out or bore out on a lathe the thread on the two ½-in. legs forming the head of the T, so that you can center part No. 9 with a press fit.

10. Part 9 should protrude on both sides sufficiently to accommodate a part No. 7 and the cap No. 6 on each end with a liberal allowance for movement.

11. This assembled unit is then bolted to the exact center of the 2 by 10 by means of four ¼-in. stove bolts. It may be necessary to run a ¼-in. drill through the holes in the pipe hangers. The use of washers on the top side of the plank is advisable, and by counterboring, this surface can be kept free from protruding boltheads.

12. After threading part No. 10 for about 1 in. with a 1-in. NPT, screw it into the No. 8 T.

When installing the seesaw vary its height from the ground according to the sizes of the children who will use it. For a real sturdy job, mix up a batch of concrete by using 1 part of cement to 3 parts of sand. By dropping in clean stones as you set the post up you will not have to use as much concrete. As the mix hardens twist the whole seesaw in a rotary fashion. This will enlarge the hole slightly and keep the vertical pipe from being set up solidly. The result will be a seesaw that not only goes up and down, but gives an added circular ride.

Questions

1. Should a hack-saw blade used for cutting pipe have fine or coarse teeth? Why?
2. How does pipe thread differ from regular American Standard thread?
3. Does a die cut internal or external thread?
4. Why do we use cutting oil on a threading operation?
5. How are auger bits sized?
6. Are the nominal sizes of pipe the actual sizes?
7. Why is a Stillson wrench better to use than a monkey wrench in tightening pipe?

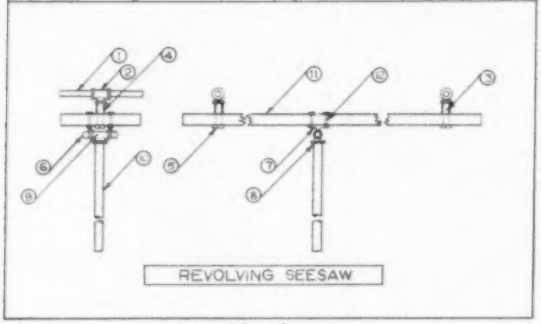
NUT OR CANDY TRAYS

P. S. BURNS
Seattle, Wash.

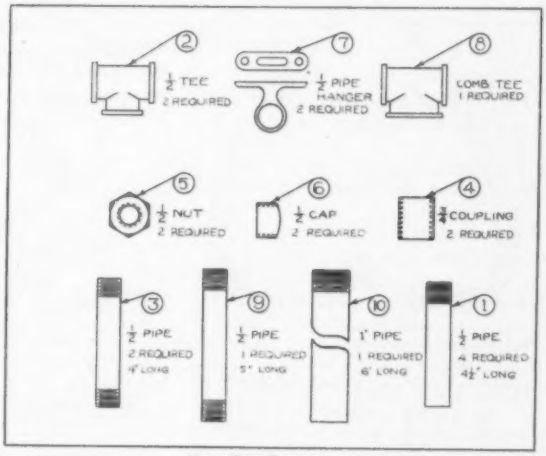
This neat appearing set of trays is appropriate for serving candy or nuts on your card table.

These trays are made of plastic which is fast becoming a popular material among craftsmen, whether amateur or skilled workers in home or school, and is ideal for these projects. The plastic referred to is either Plexiglas or Lucite as these materials are not highly inflammable. It will burn but it burns very slowly, somewhat like the hardwoods. In constructing the stems for the spades and clubs, they may be made of one piece ¾ in. thick, or they may be built up of six pieces laminated together. The only reason for building up the stem is that it requires only one thickness of material to make up the trays and that thickness is ⅛ in. If you decide to have the stem lami-

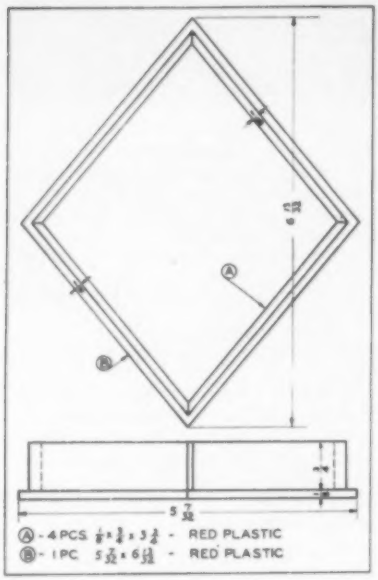
1	½ PIPE	7	½ PIPE HANGER
2	½ TEE	8	COMB. TEE
3	½ PIPE	9	½ PIPE
4	¾ COUPLING	10	1" PIPE
5	½ NUT	11	2 X 10 PLANK
6	½ CAP	12	¼ x 2¼ STOVE BOLT



Assembly of seesaw



Details of seesaw



Nut or candy tray

nated do so before you cut out the design on each separate piece.

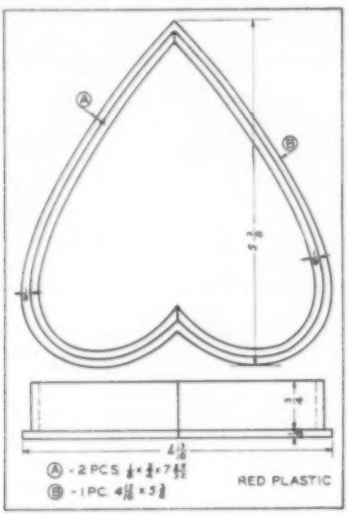
To bend plastic, heat in an oven to forming temperature, ranging from 220 to 300 deg., depending upon the shape and thickness of the material. If plastic has been properly heated, little or no pressure is required to do the forming. Ordinarily the heating process takes only a few minutes. Since plastic at 220 to 300 deg. is very hot it will be necessary to wear soft cotton gloves, or else use soft pieces of cloth to cover the material. Plastic mars very easily, so care must be exercised not to allow it to touch a rough surface when bending it.

It is always a good idea, when possible, to have a form around which to bend the plastic. This form should be lined with a soft felt or other soft material to prevent marring the heated plastic. Always remove the masking paper from the plastic before heating it.

When working plastic never remove the masking tape until all cutting, sawing, and rough sanding is completed. All lines and designs should be drawn on the masking tape as a guide.

When sawing plastic by hand, it is well to use an iron-cutting saw instead of a wood-cutting saw, although this is sometimes used. Avoid heating plastic (due to friction) when sawing. If the plastic becomes heated in sawing it becomes sticky; then use less force and slower strokes of the saw.

In power machines, the band saw should travel about 1250 ft. per minute and the circular saw should be about 5000 r.p.m., depending on the diameter of the saw. Always saw slowly and carefully and keep the saw blades sharp. For curves use a coping or a jeweler's saw. Of course, a jig saw is best, if possible. Use a smooth flat file to touch up edges after sawing and before starting to polish.



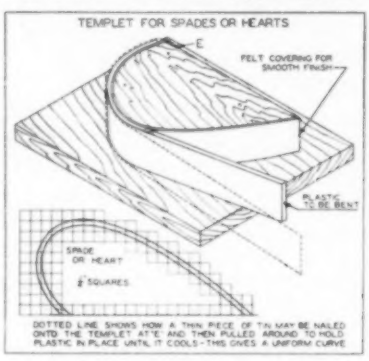
Nut or candy tray

Cementing

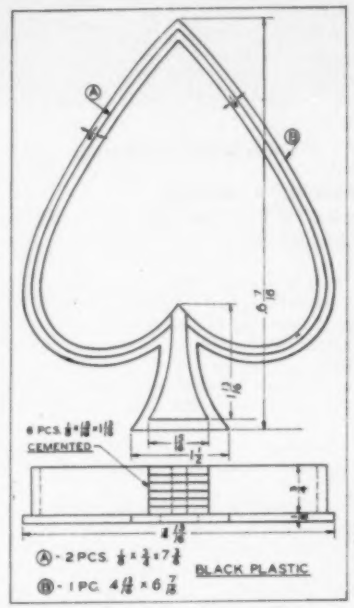
Plastics may be joined or cemented together. The action of the cement to join pieces together is due to its ability to soften the material at the joint and allowing it to flow together. Then when the plastic hardens it leaves a strong transparent joint. The liquid cement may be brushed on the joints with a brush, or the cement may be put in an open pie plate or other container, and the pieces to be joined just dipped in the cement for a few minutes, and then clamped together in proper position. Adjoining surfaces should be masked over with masking or cellophane tape to protect them. The cement takes a few hours to dry out thoroughly.

Polishing

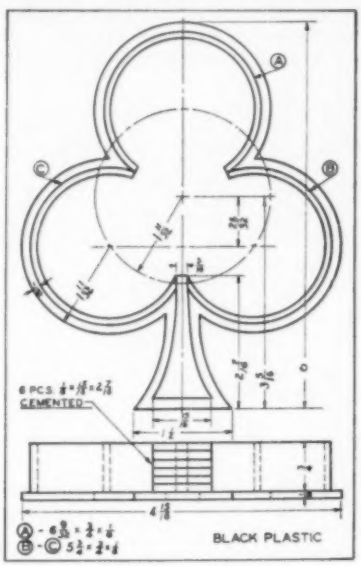
If the surface or edge to be finished needs a lot of material to be removed, a coarse abrasive is ordinarily used. For finishing, use an abrasive just fine enough to remove the scratches or marks left by the previous abrasive. Always use a fine abrasive when in doubt. Wet sanding is always preferred to dry sanding. When water is applied by any means it prevents frictional heating; it also prevents the abrasive from becoming loaded, and hindering the cutting. Surface sanding should


TEMPLET FOR SPADES OR HEARTS
FELT COVERING FOR SMOOTH FINISH
PLASTIC TO BE BENT
SPADE OR HEART
SQUARES
DOTTED LINE SHOWS HOW A THIN PIECE OF TIN MAY BE NAILED ONTO THE TEMPLET AT 'E' AND THEN PULLED AROUND TO HOLD PLASTIC IN PLACE UNTIL IT COOLS - THIS GIVES A UNIFORM CURVE

Templet for making heart or spade shaped tray



Nut or candy tray



Nut or candy tray

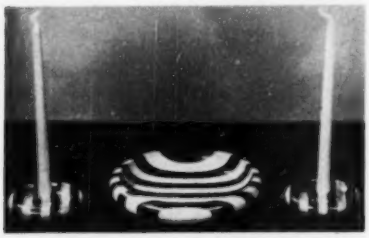
be done very lightly and over an area wide enough to avoid depressions. The material used may be any of the following: wet or dry or speed wet sandpaper, emery cloth, crocus cloth, pumice stone FF or FFF grade, and polishing paste.

Always wax the project when you are through polishing. It gives a crystal clear finish.

LAMINATED FRUIT AND NUT BOWL WITH MATCHING CANDLESTICKS

JOHN A. LARSEN
Department Head
Geo. Washington High School
Alexandria, Va.

Many interesting effects may be obtained and challenging problems encountered in the making of laminated and multicolored table



Fruit bowl and candlesticks

lamps and accessories. The accompanying photograph shows to what use one boy put some narrow strips of walnut and maple. Others have tried combinations of gum with poplar, cherry with walnut, and mahogany with pine.

Because of the prolonged gluing operation it was found desirable to use a glue that would set up slowly. In this instance the boy used a plastic resin glue with excellent results. Shellac was used as a filler to prepare the work for a French polish finish.

Projects of this type have eye appeal and have engendered interest in wood turning to a remarkable degree. In our industrial arts woodshop turning has come to be the most popular of the many activities experienced by the student.

ROD BRACKET

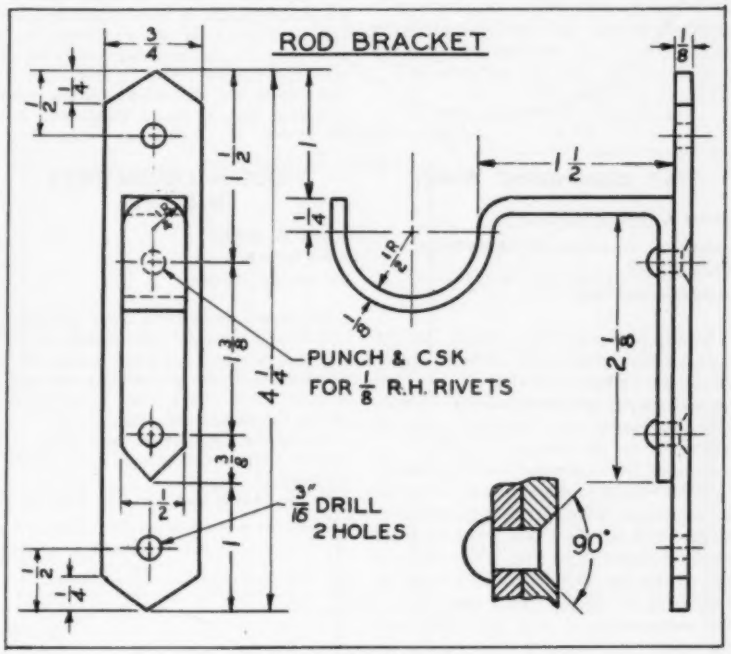
WM. K. NEVARD
Industrial Arts Instructor
Lister-Kelvin Schools
New Westminster, B. C., Can.

MATERIAL

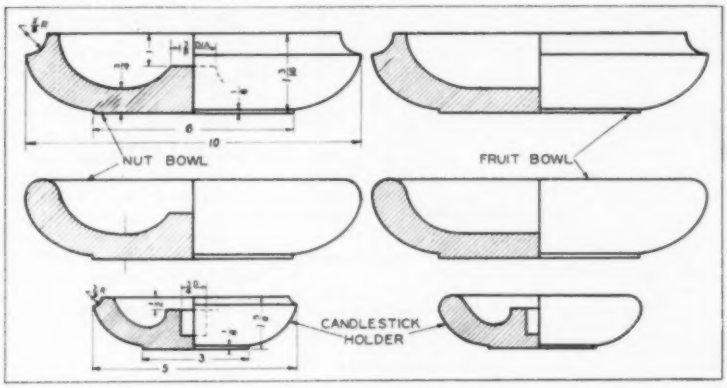
Back — 1 pc. band iron 1/8 by 3/4 by 4 1/2 in.
Hook — 1 pc. band iron 1/8 by 1/2 by 6 in.
Two 1/8 r.h. rivets

Procedure for Hook

1. Cut off required length of 1/8 by 1/2-in. band iron.
2. Lay out end shapes and positions of holes and bends. Have it checked.
3. Shear and file ends to shape.
4. Punch rivet holes 1/8 in. in diameter. Check diameter of punch and die.
5. Form the curve of the hook, using jig, mallet, and anvil, or stakes.
6. Form the square bends. The curved portion is held in the vise with a 1-in. diameter mandrel in place to preserve the shape.



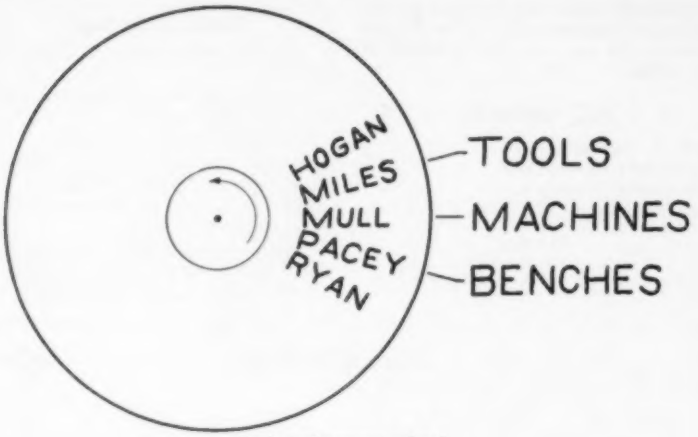
Details of rod bracket



Laminated fruit or nut bowl and matching candlestick holders

Procedure for Back

7. Cut off required length of 1/8 by 3/4-in. band iron.
8. Lay out end shapes and positions of all holes except the lower 1/8-in. rivet hole. Have layout checked.
9. Shear and file ends to shape.
10. Drill the 3/16-in. screw holes and punch *one* 1/8-in. rivet hole.
11. Assemble the parts temporarily by slipping a rivet in the upper holes.
12. Line up the parts and mark position of lower hole. Center punch and recheck.
13. Remove rivet, punch 1/8 in. and countersink both rivet holes as shown.
14. Rivet parts together. Finish as directed.



Task assignment wheel

TASK ASSIGNMENT WHEEL

ALAN L. MOREHOUSE
Instructor, Vocational Machine Shop
High School
Jeffersonville, Ind.

In shop classes the daily jobs of checking tools, machines, benches, etc., are often wisely rotated among the entire class in order that the students may learn responsibility. A simple device to control the rotation plan may be constructed in the form of a cardboard or sheet-metal wheel mounted on a rectangular sheet of similar material. Students' names are printed on radial lines near the periphery of the wheel and the different jobs are listed on the backpiece at the side. In this way each boy can see how soon his turn will come for any one of the duties. A short description of the requirements of each duty may also accompany each listed job title.

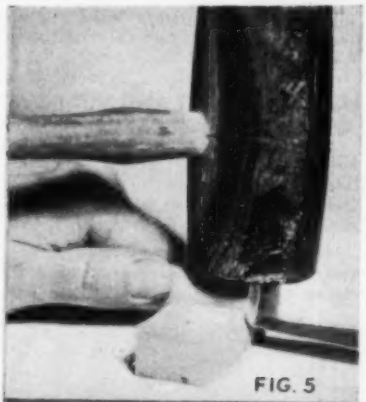
MODERN CANDLESTICKS IN COPPER

JOHN H. PIKUS
High School
Los Alamos, N. Mex.

The modern candlesticks, shown in Figure 1, have become a popular and successful project in our high school metalwork course. When completed they are an attractive and useful addition to the home when placed on the mantel, the dining room table, or buffet.

Due to the simplicity of construction they may be made in school shops having modest equipment.

As this project embodies such basic metalwork operations as laying out, cutting with tin snips, filing, soldering, chasing, forming, polishing, and lacquering, it can be introduced in the early part of an art metal or general metalwork course.



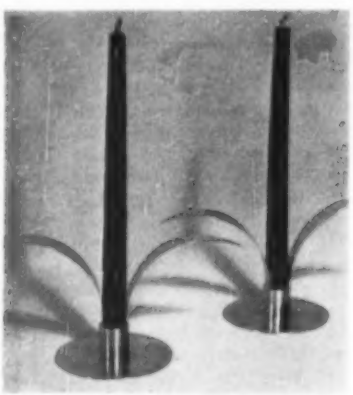


Fig. 1. Modern candlesticks

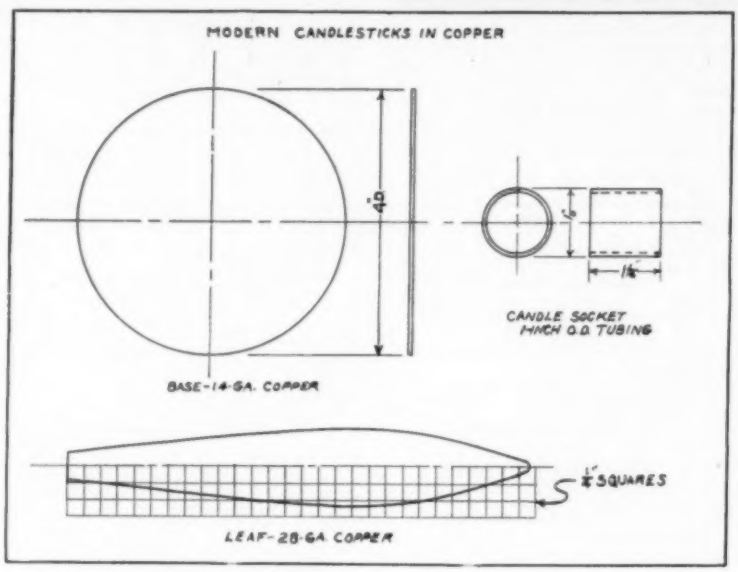


Fig. 2. Details of copper candlesticks

FIG 3

FIG 4

BILL OF MATERIALS

No. of pcs.	*Name*	*Material*	*Size*
2	Base	Copper	14 ga. 4 x 4 in.
2	Candle socket	Copper tubing	1-in. O.D.
4	Leaves	Copper	28 ga. 1¼ x 7 in.

Procedure

1. Lay out two 4-in. disks for the base.
2. Cut them out with a Handnib as shown in Figure 3, or with squaring shears. A jeweler's saw or a jig saw may also be used.
3. File the edges of the bases smooth and round.
4. Make a pattern out of cardboard or sheet metal of the leaf, as shown in Figure 2.
5. Placing the pattern of the leaf on 28-ga. copper, trace 4 leaves with a scriber, and cut them out with the tin snips.
6. File the edges of the leaves smooth and to proper contour.
7. Cut off 2 pieces of 1-in. O.D. copper tubing with the hack saw, allowing sufficient material for squaring the ends.
8. Place the tubing in a 3-jawed universal chuck on the engine lathe and square the ends by facing. If the lathe is not available, the ends may be filed square.
9. All the pieces should now be polished, first with a fine abrasive cloth and finished with fine steel wool or by buffing.
10. Chase a line longitudinally down the center of each of the leaves as shown in Figure 4. This helps to stiffen the leaves and improves their appearance.
11. Form the curve at the bottom end of each leaf to conform with the inside curvature of the candle sockets. Use a dowel and hardwood block, as shown in Figure 5.
12. Form an even and pleasing curve in each of the leaves over a rounded hardwood block or over a suitable stake, using a rawhide mallet, as shown in Figure 6.
13. Solder 2 leaves to each socket 180 deg. apart. This may be done by tinning the part of the leaf which will contact the socket, and holding leaf and socket over a flame with a pair of pliers until fusion takes place.
14. To solder the candle sockets to the bases, tin bottom edge of candle sockets and locate centrally on base. Hold over flame until the pieces are fused together.
15. Clean off all excess flux and any excess solder on the candlesticks and polish with steel wool. Apply a coat of clear lacquer to protect against oxidation.

Alternatives

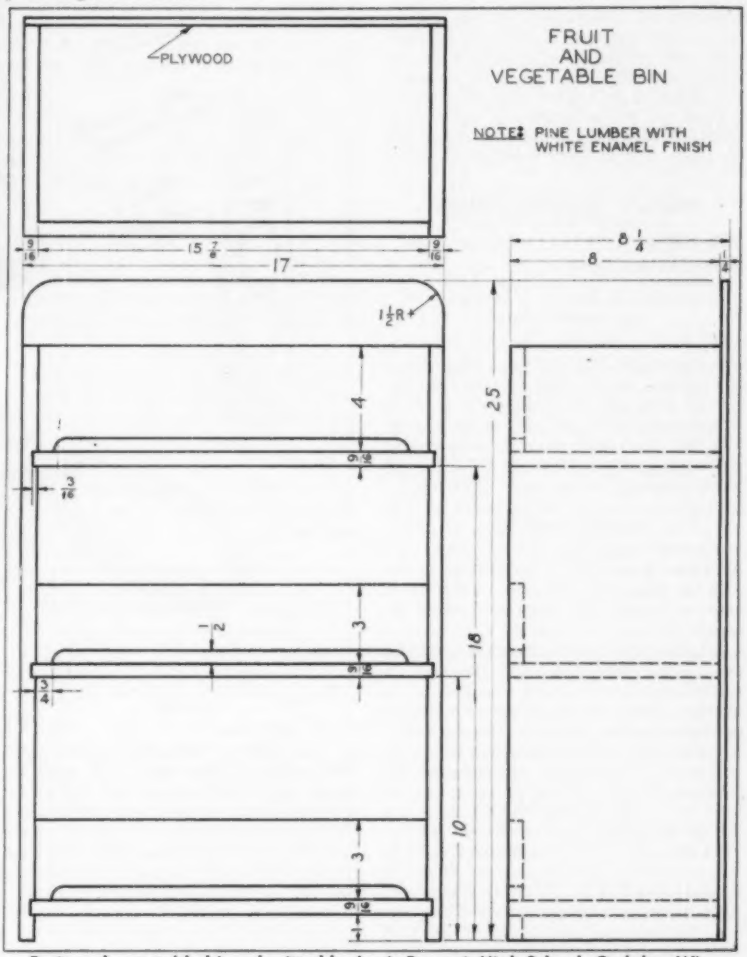
1. The leaves could be planished or more veins could be chased in radiating from the central line.
2. The shape of the base could be altered by scalloping the edges, etching a symmetrical border, etc.
3. A piece of thin felt could be glued to the bottom of each base to protect furniture.

A NECESSARY CORRECTION

On page 44 of the February, 1949, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, an unfortunate typographical error has crept into the formula shown in the very first sentence.

The corrected form is:

$$r_{tt} = \frac{a-c}{a} = \frac{1.316 - .1408}{1.316} = .893$$



Fruit and vegetable bin submitted by Louis Barocci, High School, Cudahy, Wis.

FINISHING INTERIOR WALLS

R. E. MURRAY
Co-ordinator, Trades Department
Ross High School
Fremont, Ohio

The carbide residue left after the gas has been drawn off for acetylene welding purposes is a good, inexpensive masonry or stone wall finishing compound.

Since many industrial concerns, large and small, employ acetylene welding procedure, quantities of this residue can be obtained for little or nothing.

Prior to application the walls should be brushed down with a wire brush or an old, stiff broom and then sprinkled lightly with a garden hose to create more penetration action of the fluid.

Small quantities of the carbide (5 or 10 lb.) should be mixed up at a time and diluted with water to the consistency of whitewash.

CAUTION: Don't apply this solution too thickly or it will crack and peel off. Experimentation will prove how to get the best results. A stiff whitewash brush or an old paint brush will facilitate the application greatly because not much care has to be exercised. Just be sure to get into the joints and crevices.

When dry the walls become snowy white lending more reflection and also eliminating the musty odor so often prevalent in cellars.

INDIAN SILVERSMITHING

BEN HUNT
Hales Corners, Wis.

(Continued from page 163 of the April, 1949, issue)

Tea Steeper

Probably no Indian ever made a tea steeper like the one shown in Plate 36, but nevertheless the tea steeper described in this article is an interesting and useful piece of silver work. The idea was copied from an antique piece and it seemed so practical that it was thought worth including in this series. If the reader has made the oval salt cellar, shown on page 370 of the November, 1948, issue, he already knows how to form an oval bowl. The maple die, shown at *A*, Plate 36, is similar to the one used for shaping the salt cellar, except that it needs to be somewhat larger for making this spoon.

After the bowls are hammered out of 24-ga. silver, to the shape shown at *B*, the edges are cut off and the two halves are filed to fit together. Form the hinges next by bending some 24-ga. silver as shown at *C*, and solder it in place with medium solder. Saw off a small section *D*, and fit it into the large section as shown at *E*, Plate 36. For soldering, rest the bowl on the corner of a charcoal block, and lay the half hinge, bent to fit, in position. Then flux and place two snippets of solder in place. Allow the flux to dry before attempting to solder. See *F*, Plate 36. When it is soldered paint the entire soldered portion with rouge, even forcing rouge into the hinge hole. Then take a piece of iron wire about the size of the pin, and rouge it. When dry, put the other half of the hinge in place and insert the rouged pin. Then place the top half of the spoon in position, fit the hinge to it and solder. The reason for rouging is to prevent solder from running where it is not wanted. Be careful not to get any of the rouge mixed with the flux. Letting the rouge dry first is one way of preventing the possibility of getting the two mixed.

Next take out the iron hinge pin and solder the clasp on the upper half. If there is no spring silver on hand, nickel silver may be used for the clasp.

The handle should be made out of a ¼-in. strip of 14-ga. silver, hammered flat for the upper end and on the edge for the narrow section. File out all irregularities, stamp and bend it to shape. The flattened section is also domed slightly to give it more rigidity. Use some rather heavy iron wire to hold the handle in place for soldering, and do not forget to rouge

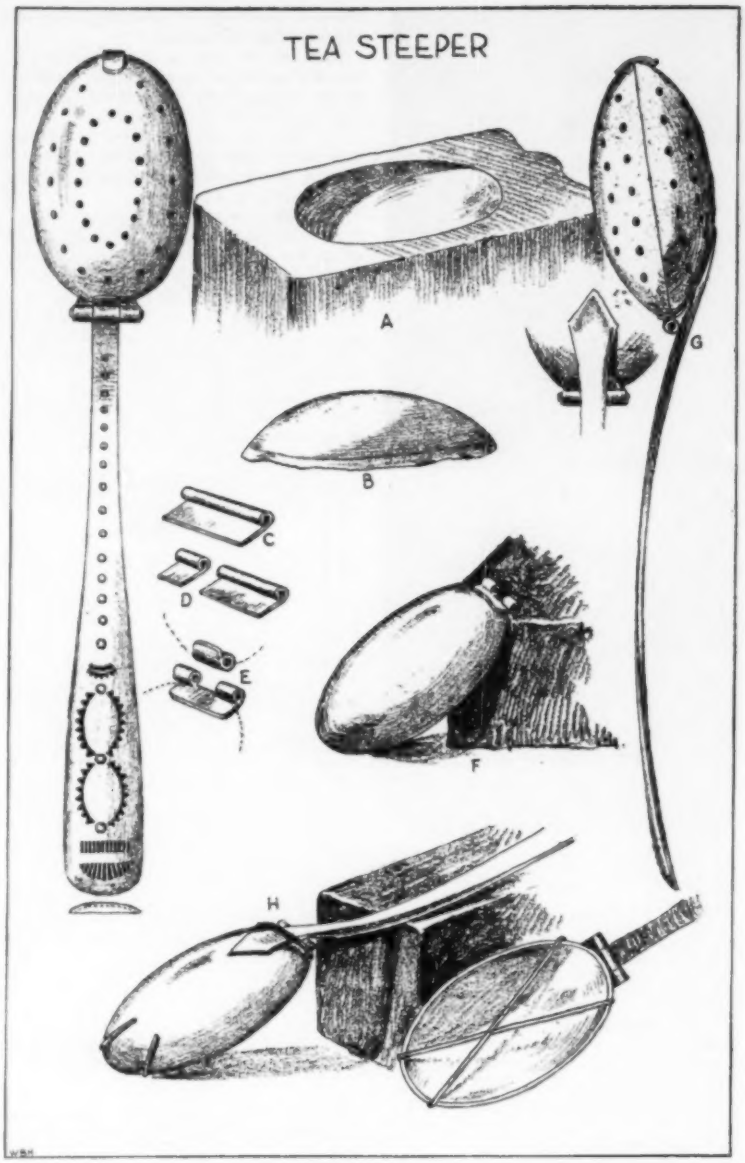
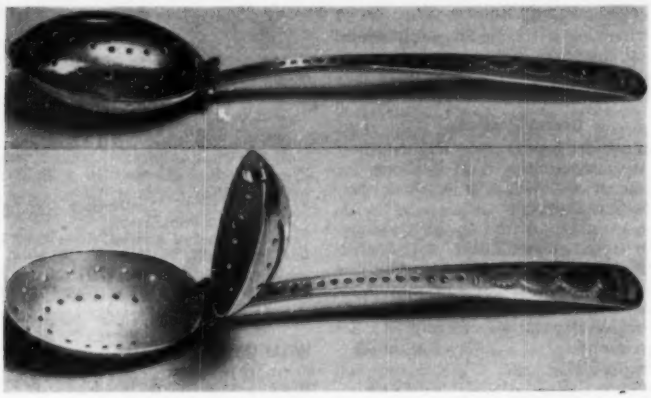


Plate 36



Tea steeper

the hinge to prevent the solder from melting.

At *H*, Plate 36, is shown a simple and efficient way of wiring. The holes in the spoon bowls are drilled with a 1/32-in. drill after which both parts should be buffed and polished. You may have to use a larger drill to take off the burrs around the holes. Just hold the drill between your fingers and give it a turn or two. Then buff and polish the entire steeper. Then cut a piece of wire for the hinge joint. Make the piece about 1/16 in. longer than the hinge and tap it lightly on both sides to upset the wire enough to prevent it from slipping out.

LEATHERCRAFT

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History and Tanning

Leather had been used by man for centuries. It was used by the ancient Egyptians over 3300 years ago. There are numerous references to leather in the Bible.

Preparing

1. Soak skins in water 1 to 7 days to make them pliable.
2. To remove the hair, it is decomposed and scraped off by liming the skin and running it through a dehairing machine. The fatty material is then removed from the underside by machine, after which the skin is washed and rewashed.
3. Batting to produce a fine grain. Then washed and pickled.

Tanning — Vegetable and Chrome

1. The vegetable method is used on heavy leather. The skins are halved and put in solution for 2 to 3 weeks and then sprinkled with ground bark and left for 2 weeks; then the skins should be scrubbed and cod oil is applied and they are then allowed to dry.
2. Leather tanned by the chrome method is pickled in acid and salt and tumbled in tumbling drums for 5 to 6 hours. Alum chrome is used to prepare white leather. Chamois is cured by an oil process. The by-products are all used. The hair is used in wallboard and in textiles. The flesh, ears, and noses are used for glue. Gelatin is made from the flesh also.

Cutting

Leather is cut either with a hand knife or a press knife. A much better job can be done with a knife than with shears. However, shears may be used to great advantage on curves, etc.

When cutting leather, be sure to use a very sharp knife. This is a must. A piece of cardboard should be placed under the leather so that the knife will make a clean cut. Cardboard is much better than wood, since it has no grain and will not deflect the knife blade.

Skiving

Skiving is merely paring down the edge of a piece of leather when joints are made. Skiving can be done either by hand or machine. A very sharp knife is needed. It is best to start the cut about ⅜ in. from the edge.

Tooling and Embossing

Tooling is putting imprints on leather.

1. Moisten leather with water, usually from reverse side.
2. Clip pattern to face of leather.
3. Trace outline with deerfoot tracer.
4. Remove pattern; deepen traced lines.
5. Flatten edges to remove marks.
6. Embossing — from reverse raise design within tooling marks with leatherworking tools.

Lining

Purpose: Adds to the appearance of the project and gives it a more finished look.

Types of material used: Skiver, suede, velvet, silk, or cotton moire. Skiver is a very thin leather which is made by splitting sheepskin by means of special machinery. It comes in various colors and is usually used for linings.

Silk or cotton moire, and even velvet are used, but are not suitable for thonged edges, as the material frays around the thonged holes. To get over this difficulty, a narrow strip of leather can be glued on the inside edge and holes punched through it.

It is difficult to stick moire onto leather without having the paste show through. Never put paste on the silk or velvet. Coat the leather thinly with it, then smooth the material carefully down on the top. A rubber roller is very good for this purpose.

Preparation of lining: Wax polish all work well before any make-up work. This protects the surface should any paste or glue get on the leather during the process.

1. Always cut the leather linings a little larger than the leather to be lined.
2. Where several thicknesses of leather are to be put together, the edges of the article itself, not the lining are skived.
3. Place leather to be lined on any solid surface.
4. Rubber cement, or any similar adhesive should be spread very thinly over the wrong side of the article, not the lining.
5. The lining should then be laid down on the leather and smoothly and tightly pressed over the entire surface.
6. Place the work on blotting paper; cover top with blotting paper, and roll with a brayer.
7. Do not remove the work from the blotting paper after you have rolled it, but put it under a weight in order to press the leather and lining firmly together.
8. After the glue is dry, the edges of the lining should be trimmed if necessary.

Punching and Thonging

Punch for round hole: Thong chisel for line of small cuts. The holes or cuts can be from ⅛ to ¼ in. from the edge of the leather.

Leather Punching

Spacing automatic with thong chisel. Some punchers have spacers and depth gauges. One must use care to punch on the marks. The punch is for round thong. The thong chisel is used for flat lacing. The chisel makes a series of 3, 4, or 5 slits. The thong chisel producing more than one slit cannot be used to go around corners. For this, use a chisel making but one slot.

Kinds of Leather

English calf	Alligator
Lining calf	Lizard
Suede	Ostrich
Cowhide	Pigskin

Decorating: *Modeling*, geometric figures transferred by tracing paper. ***Embossing***, raising background. Staining (oil or water stain) can stain whole job, part of job, or lacing. Wax is used for shine, to keep dirt out, to help waterproof. *Piercing*, cut out design and put leather under it. ***Applique***, cut out design and cement it on leather (overlay).

Leather Fastenings

Snaps: (1) Cap, (2) cap eyelet, (3) spring, (4) spring eyelet.

Procedure:

1. Punch hole for cap eyelet in leather. Line up holes by making pinhole through both pieces of leather.
2. Punch hole for cap eyelet in flap.

3. Punch hole for spring eyelet.

4. Dies (positive and negative).

5. Place cap eyelet through leather and in cap. With snap attaching set in cap eyelet and hammer on cap, strike with mallet or hammer and set the cap eyelet.

6. Insert spring eyelet through leather. Place spring on spring eyelet. With snap attaching set in spring eyelet and other end of hammer over spring, strike hammer with mallet or hammer and set.

Eyelets:

To secure key plates: (1) Insert eyelet through right side of leather. (2) Place key plate on inside. (3) Crimp with punch or pliers.

Buckles: Use cobblers stitch. To pierce holes use awl.

Zippers: Zippers are placed between cover and lining and sewed.

Lacing of Leather

Lacing is purchased by the yard, or cut by hand. It can be obtained either round or flat. It is generally 3/32 in. wide. Goat or calfskin are best lacing material. Imitation leather lacing can also be obtained.

Procedure:

1. Skive the edges of material.
2. Cement edges together.
3. Trim edges.
4. Lacing can be colored with India ink.
5. Space holes about 3/16 in apart, and 3/16 in. from edge.
6. Length of lacing depends on type of stitch used.
7. Overcast or whip — 3 times length. Buttonhole — 5 times distance to be laced.

Start from inside leaving one end inside. Go around through same hole and through the opposite one. Be sure that lacing doesn't twist. To finish: Come back through two of the loops.

Embossing: Moisten leather and run wheels over it to obtain design. Electric pencil can be used to put gold leaf designs on projects. Wax is used to keep leather clean and to waterproof. Leather can be cleaned with saddle soap or with a weak solution of hydrocloric acid.

TOOLS — EQUIPMENT — MATERIALS

Spacing punch — making holes for lacing
Hollow punch — for holes that cannot be reached with hand punch
Thonging chisel — slits for lacing
Leather tools — deerfoot, tracer, modeler, ball tool for decorating leather
Snap attachment set — for setting snaps
Eyelet punch — for setting eyelets
Skiving knife — for skiving leather
Leather knife — for cutting leather
Fid — for opening holes
Steel square and scale — for laying out and guide for cutting leather
Marble or plate glass — a working surface
Rubber cement — for cementing lining and leather
Mallet — for striking chisel and snap attachment set
Lacing — for edging leathercraft — purchased by yard or foot
Leather — purchased by the whole or half skin, square foot, exact size, by the kit, and by the pound
Lining — purchased as needed
Pattern and design — to beautify the article

Supply Houses

Practically all references list supply houses and most cities have leather outlets. Many industrial-arts instructors are fortunate in purchasing scraps suitable for school craft work.

Demonstrations

In introducing a new activity into the school shop, the demonstration is an ideal way for class interest. Following is a list for leathercraft demonstrations:

How to: make designs, make templates, transfer templates, cut leather, skive leather, tool leather, model leather, emboss leather, prepare background, clean leather, color, incise and carve, use the edge creaser, line, punch, use thong chisel, lace-variety of stitches, splice lacing, set eyelets, set snap buttons, use electric pencil with foil, wax.

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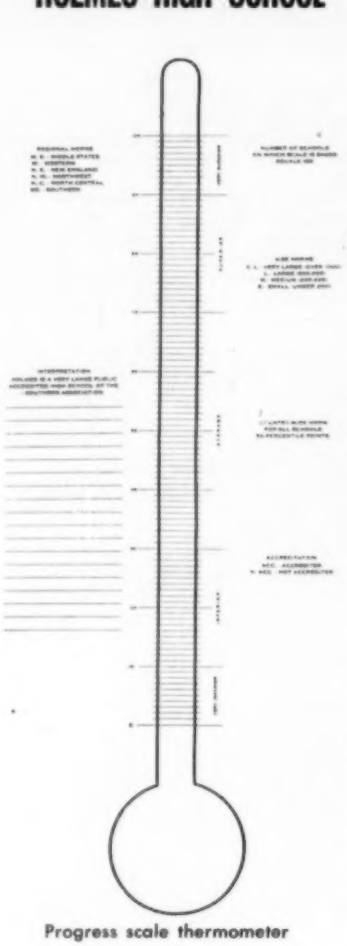

Progress scale thermometer

PROGRESS SCALE THERMOMETER— A PRINTING JOB

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Printing Instructor
Holmes High School
Covington, Ky.

The Holmes High School printing department was asked to produce a quantity of thermometers to be used in connection with an evaluating program conducted by the Southern Association of Colleges and Secondary schools.

The printing of these thermometers was a new and interesting project involving much trial and some error. After several unsuccessful attempts to cut a satisfactory block on either a band or a jig saw, a drill press wheel cutter was purchased for $1.69 and with it a block 1¾ in. in diameter was cut from a piece of wood that had been planed less than type-high.

A piece of 3-point fullface foundry rule was bent completely around the block, cut to proper length, and fastened in place by a strip of adhesive tape.

A board was squared to 6 by 20 in., planed less than type-high and an outline of the thermometer was sketched on it. Again using the wheel cutter a hole was cut in the board just large enough to receive the round block with the rule and adhesive tape around it. Another strip of tape was necessary to make the block fit snugly into the hole.

The round block was removed and two saw cuts were made leaving an opening the exact width of the tube of the thermometer. The round block and rule were replaced in the hole and filled tightly. A piece of rule was bent to form the top of the tube and two straight pieces of rule were cut to complete the sides of the tube. A strip of wood was cut to fit tightly inside the tube. Wet paper towels were packed into the round top of the tube. The opening above the end of the tube was filled and a strip of wood tacked across the end of the block to keep it from spreading. The portion of the circle between the sides of the tube was cut away with a knife.

The form was then ready for lockup and the desired number were printed on a 14½ by 22-in. press with the thermometer properly positioned on the sheet. The scale was made of 6-point column rule cut 6 picas and 12 picas long. Two point leads were placed between the column rule to give the scale the desired length. The 12-pica rules were cut off

enough to permit placing of the numbers indicating degrees. Rules were cut on right end to permit placing of the side captions. The type for the side notes was set 15 picas wide and properly spaced.

A 12-point slug was placed on each side of the scale and the type forms placed against it. This made a form 44 picas wide. The heading was set 44 picas wide and the form was ready for lockup. As all lines had been carefully justified there was not too much difficulty in locking up the form.

The scale form was then positioned and printed on the sheets upon which the thermometer had been previously printed. When the second printing was completed the job was ready for delivery.

AID FOR TEACHING MAGNETISM

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When teaching phenomena of electricity to young teen agers, it is difficult to portray the molecular structure of magnetized metals. The teaching aid described herewith, has been made by the author and has been found to be very helpful.

Explanation of Teaching Aid

The teaching aid employs 12 small magnets sandwiched between three layers of clear plastic such as Plexiglas. The magnets are normally in a helter-skelter arrangement as the molecules in a piece of nonmagnetized metal would be. However, when the device is placed between the opposite poles of two magnets and tapped, the small magnets arrange themselves in a definite pattern as do the molecules in a piece of metal that has been magnetized.

Construction of Teaching Aid

Three pieces of 1/16 by 2⅞ by 2¼-in. clear plastic, and a piece of band-saw blade are the materials needed. In one piece of the plastic, drill 12 ½-in. holes as shown at *A* and *B* in Fig. 1.

Grind the teeth from the piece of band saw blade and reduce it to a width of 3/16 in. Cut off 12 pieces of the blade, each ⅜ in. long.

Magnetize these small pieces of metal either by using another magnet or by placing them in a d.c. electric coil. The entire blade may be magnetized before cutting if desired. Use a small compass to locate the north pole of each small magnet and mark it with India ink or some other permanent dye. Glue the three pieces of plastic together with the drilled piece in the center and the small magnets in the holes. Care must be taken to avoid using excess glue so as to prevent the magnets sticking to the plastic.

Use of the Teaching Aid

To use this aid lay it on a flat surface and place a bar magnet at each end, the north pole of one magnet next to the plastic and the south pole of the other on the opposite side as shown at *A* in Figure 1. Tap the plastic with a pencil and the small magnets will turn to line up with the large ones.

By letting the small magnets represent molecules in a piece of steel the students can observe the action of the molecules lining up when steel is placed in a magnetic field, and is tapped. When removed from the magnetic field the small magnets can be disarranged by shaking. Difference in magnetic attraction can be demonstrated by placing a small compass the same distance from the plastic case before and after the small magnets are arranged in an end-to-end position.

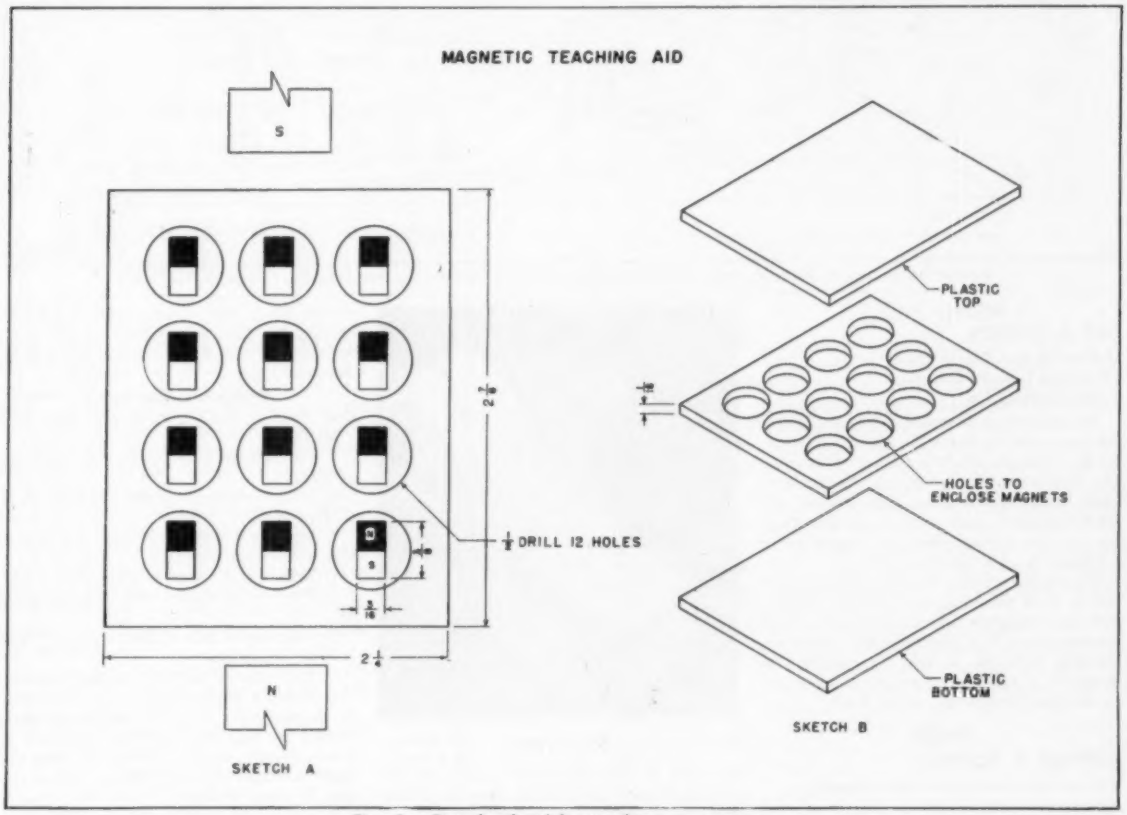
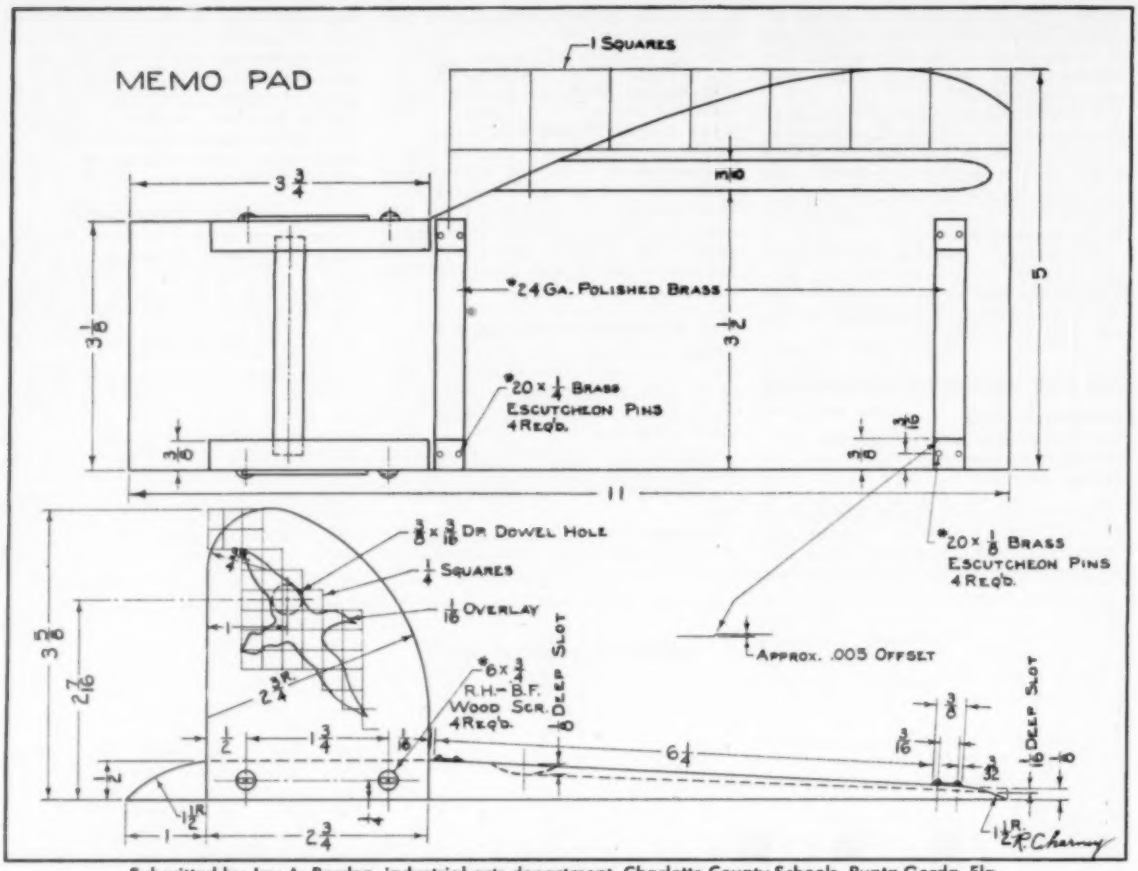


Fig. 1. Details of aid for teaching magnetism



Submitted by Jay A. Borden, industrial-arts department, Charlotte County Schools, Punta Gorda, Fla.

MEMO PAD

JAY A. BORDEN
Industrial Arts Department
Charlotte County Schools
Punta Gorda, Fla.

The memo pad described herein was developed and used by Ralph W. Charney, instructor at the State Teachers College, California, Pa., and the writer during 1947. It has been tried in the junior-senior high schools and advanced classes, and makes an excellent project for the general shop or wood-drawing combination of shopwork.

The project enables the instructor to make use of small pieces of wood, metal, plastics, and other materials that are difficult to utilize in many shops. It is suggested that a penetrating type of finish be used by beginners in shopwork as this type of project is not suited to the usual sanded and rubbed finish.

SPURS

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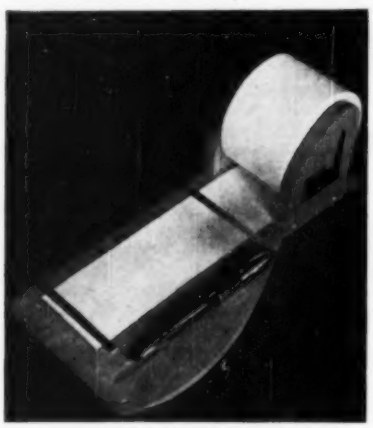
Arroyo Grande Union High School
Arroyo Grande, Calif.

This project was originated at the request of boys in the metal-shop classes of the Arroyo Grande Union High School, California, and has proved to be very popular.



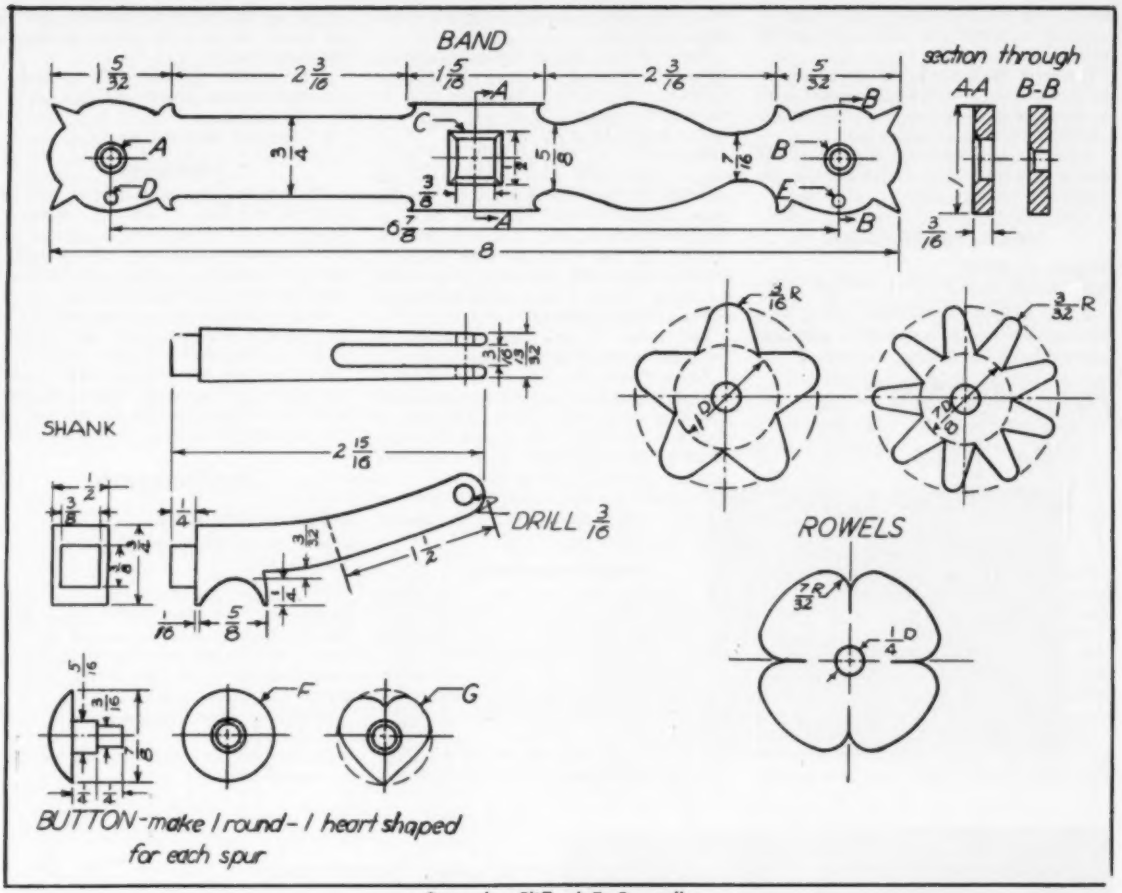
Memo pad

Manipulative processes included in the project are filing, hack sawing, drilling, grinding, bending hot steel with a hammer and stake, squaring a round hole, riveting, finish filing, and polishing.

Procedure (one spur)

Heel Band. 1 piece 3/16 by 1 by 8-in. mild steel

1. Cut the stock to length with hack saw or shear.
2. Locate and center punch for holes *A*, *B*, *C*, *D*, and *E*.
3. Drill holes *A* and *B* 3/16 in. in diameter, and countersink slightly.
4. Drill hole *C* 3/8 in. in diameter.
5. File hole *C* square with a small square file.
6. Countersink hole *C* about 1/16 in.: This is done with a file.
7. Drill holes *D* and *E* 1/8 in. in diameter.
8. Cut out a paper pattern of the design as shown, place it on the metal and trace around the edge with a scriber. It is well to polish one flat surface of the heel band and apply a copper marking solution before this step is accomplished.
9. Cut to the outside edge of the outline line with the grinder and hack saw.



Spurs by Clifford E. Boswell

10. Finish to the line with a second-cut file.

11. Heat the heel band and bend with a hammer over a 3-in. pipe held horizontally in the vise. The bend must be made with the countersunk holes on the inside. One should check at this time to see that all countersunk parts are on the same side of the heel band.

Shank. 1 piece ½ by ¾ by 3-in. mild steel

1. Locate and centerpunch for rivet hole.
2. Drill 3/16 in. in diameter
3. Mark and cut the groove for the rowel. First drill a 3/16-in. hole at the terminal of the slot; then cut to it with a hack saw.
4. Mark with a scriber and cut with a hack saw the end opposite the rivet hole as shown in the drawing.
5. Taper the shank from ¾ in. at the square end to 13/32 in. at the rowel end. Use a file for this purpose.
6. Round the rowel end of the shank with the grinder and file.
7. Heat and bend to shape over a pipe held horizontally in the vise or over an iron stake.
8. Clean up all surfaces with a second-cut file.

Rowel. 1 piece 3/16 by 1¾ by 1¼-in. mild steel

1. Locate center by drawing diagonals and center punch.
2. Drill center hole ¼ in.
3. Form to the shape desired with a hack saw, grinder, and file. Suggested shapes are shown in the drawing.

Buttons. Two needed for each spur

Two carriage bolts will do, or these pieces may be turned on the lathe. The shoulder is necessary to afford space between the head and the heel band for fastening the strap. Usually one plain and one fancy button are made for each spur with the fancy one being worn on the outside edge of the boot.

Finishing

Drawfile all parts with a smooth file to remove all scratches and sharp edges; then polish with fine emery cloth and finally with Tripoli and rouge on the cloth buffer.

Assembling

1. Rivet the rowel in place in the shank with a 3/16-in. roundhead iron rivet. The point of the rivet should be headed with a rivet set. Great care must be taken in heading the rivet to prevent it from bending in the middle. The rowel must fit loosely in position in order to jingle as the spur is moved.
2. Rivet the shank in place. Fasten it in the vise with the square end up. Set the heel band in position and flatten the end of the holder into the countersunk part of the square hole with the peen of a ball-peen hammer.
3. Rivet button *F* into hole *A* by flattening the point into the countersunk part of the hole. The point should be left flush with the inside surface of the heel-band.
4. Rivet button *G* into hole *B*.
5. Rebuff the spur on the cloth wheel; then clean thoroughly with a rag dampened with carbon tetrachloride. Apply one coat of clear lacquer to prevent rust from forming.

It is recommended that spurs be nickel-or chrome-plated if possible, as a very beautiful rust-resistant finish can be obtained in this manner.

The heel band can be further ornamented by setting small roundhead, copper or brass

rivets along the fancy edge of the band. A copper or brass rivet may also be used to hold the rowel in place.

The small chain which fastens in holes D and E of the heel band and which passes under the instep of the boot can be purchased from a hardware store or a saddle shop.

A suitable spur strap may be made in the shop or in a crafts class, or one may be purchased at a nominal cost.

SMALL BRASS LAMP

HOMER C. ROSE
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A few small pieces of brass and a little craftsmanship can be combined to make this interesting and useful lamp, Figure 1.

BILL OF MATERIALS

No. of pcs.	Name	Material	Size
1	Pipe nipple	Steel	⅛-in. pipe x 1 in.
1	Collar	Brass	¾-in. O.D. x 1/16 in.
1	Column	Brass tube	½-in. O.D. x 7 in.
1	Leaf	Brass	20 ga. 5/8 x 7½ in.
1	Top disk	Brass	20 ga. 2½-in. dia.
1	Base	Brass	16 ga. 4½-in. dia.
6	Feet	Brass	28 ga. ½-in. dia.

Procedure for Making Parts

Pipe Nipple — Part 1. This part may be purchased or made from standard ⅛-in. pipe threaded to fit the socket.

Collar — Part 2. This part may be cut from a tube or a rod and shaped by hand methods or on the lathe. The inside diameter should be the same as the outside diameter of the pipe nipple.

Column — Part 3. Cut the column to length and shape the end as indicated in Figure 4. The piece may be turned in the lathe for best results. However, a careful filing job should prove satisfactory.

Leaf — Part 4. Cut to size as indicated in Figure 4 and round all edges slightly, with fine-tooth file. Carefully form the part by wrapping it around a ¾-in. rod, slide onto Part 3, and solder at the base.

Disk — Part 5. Lay out disk and center hole on appropriate stock. Clamp stock and drill hole. If this piece is drilled on the drill press, extreme caution should be taken to clamp the piece securely. Cut to outside diameter. File and round all edges carefully. Form the piece with the aid of a groove in the end of a piece of wood and an appropriate mallet or plastic hammer.

Base — Part 6. Drill hole as in Part 5. Trim disk to shape and file edge.

Feet — Part 7. Cut disks to ½-in. diameter from thin brass stock, using hollow punch and lead block as shown in Figure 2. Form these disks into cup shape with dapping block and punch as shown in Figure 3. A wood block may be substituted. Remove all burrs.

Polish all parts with buffing wheel and compound. A softer finish may be obtained by using fine steel wool.

Steps in Assembling

1. Assemble parts 1, 2, and 3 by coating the surfaces that touch each other with solder and then applying heat to sweat-solder them together. (Part 3 now includes Part 4.)
2. Assemble Parts 3, 5, and 6. This may be done by placing the parts together and soldering around the column where it projects through bottom of the base.
3. Lay out the positions for the feet.
4. Coat the edges of the feet with solder.
5. Locate the feet, being careful to get top and bottom halves in the correct relationship with each other.
6. Sweat-solder the feet to the base. It is recommended that a small torch be used.
7. Wire the lamp.
8. Clean and finish the metal.

Alternatives

The lamp may be made of steel, with appropriate planished surfaces. A number of designs may be incorporated in place of the leaf illustrated in Figure 4. For example, a wire with sheet-metal leaves attached to it could be wound around the column.

Short lengths of ½-in. tubing soldered to the bottom of the base could take the place of the feet illustrated in Figures 1 and 4.

A square base with four legs could be used.

A square base with short lengths of tubing which have been split along one side and slid onto the edges of the base, also might be used.

PHOTOGRAPHY

HARRY A. GOLDSTEIN
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Tucson, Ariz.

The Badger Camera Clickers, a photographic club of the Tucson Senior High School, Tucson, Ariz., sponsored by the author, set up the following check list of things that have to be right in order to make a good photographic picture.

If all your camera equipment is in tiptop working condition,

If your film isn't outdated and has been stored properly,

FIG. 2

FIG. 3

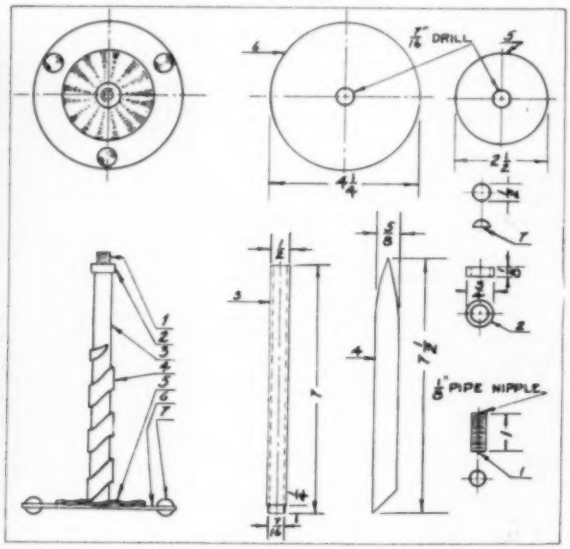


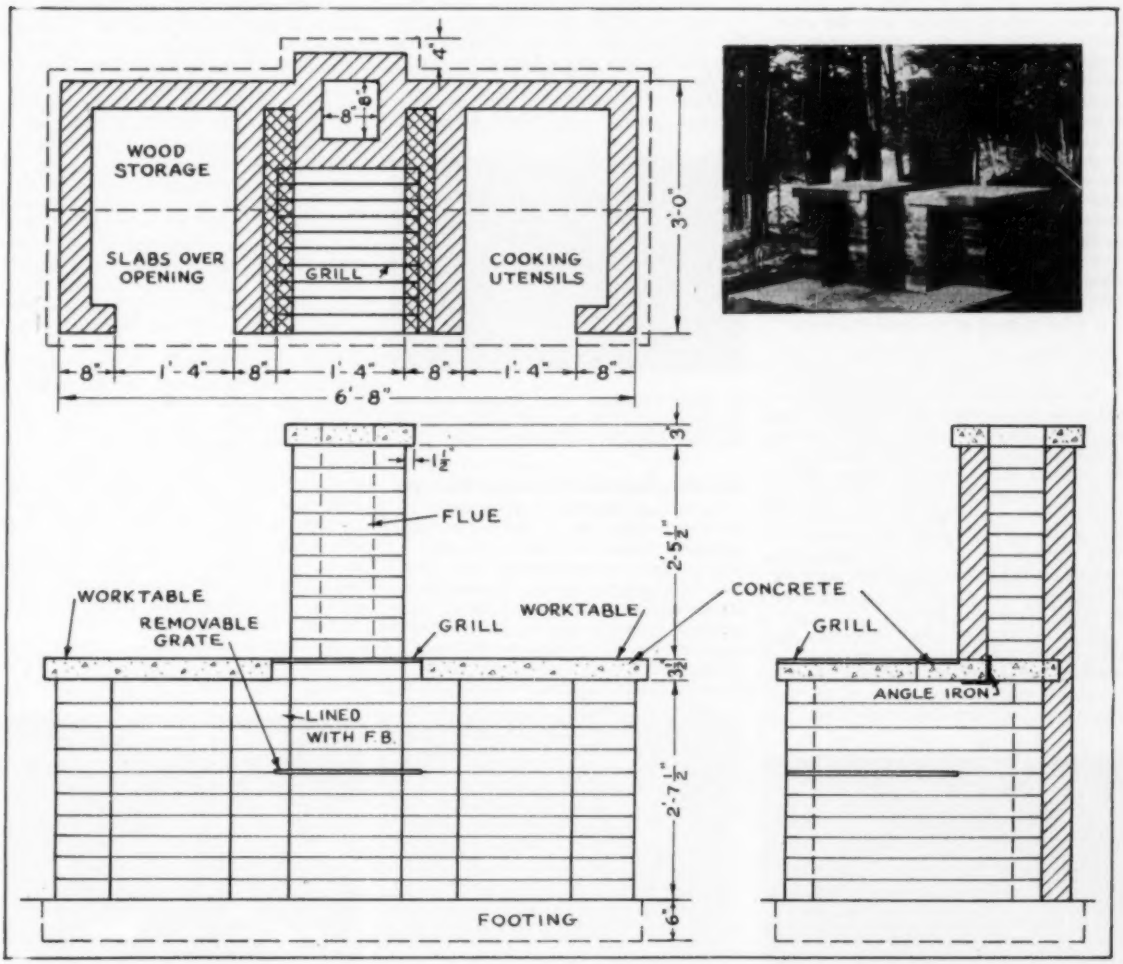
Fig. 1. Small brass lamp. Fig. 2. Cutting disks with hollow punch and lead block.
Fig. 3. Dapping block and punch used for forming the feet. Fig. 4. Details of lamp.

If you load your camera without getting fog from stray light,
If you don't get fingerprints on the film while loading it,
If you select the right aperture,
If you use the right shutter speed,
If you focus sharply on the subject,
If you use the correct filter and make proper exposure compensation for it,
If your lens is shielded from direct rays of light,
If your lens is clean,
If the subject doesn't move,
If your camera is kept steady,
If you get all of the subject in the field of view when you click the shutter,
If you don't forget to put in the bulb, if it's a flash shot,
If you don't forget to pull the slide,
If you haven't pulled the slide with the lens still open for focusing,
If you have cocked the shutter,
If you trip the shutter at just the right moment to get what you want,
If you don't make another exposure on the same piece of film,
If you haven't tilted the camera,
If you keep the negative from the light until it has been developed,
If you use the right developer for the right time at the right temperature,
If your negatives don't stick together in tray or tank,
If you don't put them into the typo before the developer,
If you don't scratch the film while the emulsion is still soft,
If you let it fix thoroughly before exposure to light,
If the film dries without collecting a lot of dust marks,
If you select the right printing paper to fit the negative,
If your paper isn't fogged,
If you give the right exposure with contact printer or enlarger,
If you have mixed your paper developer in the correct proportions,
If you develop the print properly,
If you fix it thoroughly,
If you wash it long enough,
And if it doesn't stick to the ferrotype tin — you will get a good picture.

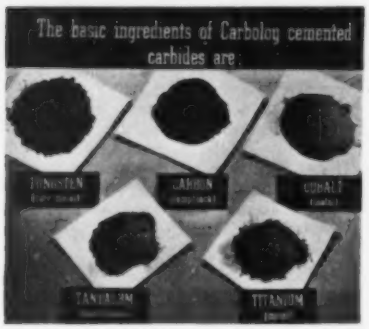
TUNGSTEN CARBIDE TOOLS IN THE SCHOOL SHOP

RALPH B. POPKIN
Merrill, Ore.

The development and use of tungsten carbide tools has created a revolution in the manufacture of industrial products in America



Barbeque fireplace designed and submitted by J. Edgar Ray, The Stout Institute, Menomonie, Wis.



and has probably effected a change unequaled by any other single material. This material has had a profound effect upon the economy of our country and, therefore, upon the lives of all Americans. The widespread use of tungsten carbide in industry since the beginning of the late war was largely responsible for the production records of wartime industry and, indeed, is largely responsible for the increasing productivity of industry today. Both the industrial arts and vocational school shops are presented with ever widening possibilities for the uses of this truly wonderful material. The teaching of the uses of tungsten carbide tools is a responsibility laid upon all shop teachers. No less a responsibility is that of teaching to youngsters the effects upon society of a material which has created another "Industrial Revolution."

A Brief History of Tungsten Carbide

The history of civilization has in large measure been influenced by the development of the tools which men have developed as well as the uses to which these tools have been put. Indeed, the "ages" of man may be marked by the tools and materials which characterized the products of his ingenious labors. Hence, the Stone Age, the Bronze Age, and Iron Age define distinct historical eras. The quest of man is always to improve his standard of living through the use of more productive methods applied to more functional materials. In the modern age, it may be said that this is the era of "Tungsten Carbide."

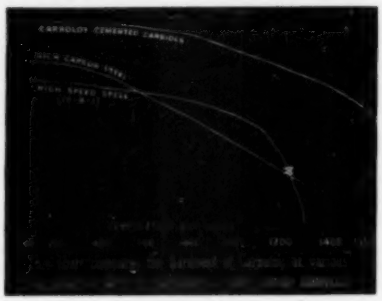
The metal, tungsten, which is the basic element of tungsten carbide, has been used for centuries and is one of the oldest alloying elements in steel. Ancient swords of the East were made of tungsten steels; their quality has become legendary. Tungsten was first isolated in 1783. It is to be found all over the world; the greatest known source exists in Asia, particularly in China and Burma. In 1941, the ores were discovered in Valley County, Idaho, and presently, much of the ores are furnished by Central and South American countries. The tungsten ores are chiefly wolframite and scheelite. When purified, tungsten is hard, brittle, and nonmagnetic and is virtually noncorrosive.

In 1896, two scientists simultaneously produced ditungsten carbide. This discovery of ditungsten carbide was followed in 1914 by two German scientists who discovered and patented the method of manufacturing tungsten carbide. This date may be said to mark the beginning of the present era of tungsten carbide. Quickly following the original patent describing the manufacture of tungsten carbide, a patent describing the addition of auxiliary metals was granted. Following World War I, tungsten carbide was imported to the United States from Germany. The material as it existed then was of limited use due to the difficulties involved in its use as well as in fabrication. As a result of the research of American industry in the fabrication and use of tungsten carbide, there is now available to all the present products of tungsten carbide which are classed as cemented carbide.

The Manufacture of Cemented Carbides

The primary ingredients of cemented carbides are tungsten, carbon, and cobalt. Tantalum and titanium also may be added to achieve characteristics suitable for specific uses. The tungsten carbides are formed by adding carbon in the form of lampblack to the powdered tungsten, then heating in an atmosphere free of oxygen, to temperatures ranging from 1500 to 2400 degrees Centigrade. The combination of time, temperature, and atmosphere are carefully controlled to produce the proper carbon absorption of the tungsten. The resultant tungsten carbide is in powder form in a finely divided state and of varying sizes of particles. These particles are extremely hard.

The next process is to add the cementing material, cobalt. The cobalt used is in powder form having been produced by reduction at low temperatures from the oxide. The cementing process is similar to the process used in making concrete cement and the resultant product is of comparable structure. The carbide would correspond to the gravel and the cobalt performs the same function as the cement, i.e., it acts as a binder. By varying the amounts of gravel and cement, it is possible to produce various qualities in concrete. The same is true of the cemented carbide. In making the mixture for concrete, it is desirable to use gravel of uniform size. So it is with cemented carbides. The powdered tungsten carbide is graded through careful screening. Then predetermined quantities are mixed in a ball mill similar in action to that used in ceramics for mixing glazes. The effect of this tumbling is to coat the particles of tungsten with a film of cobalt. This is a process similar to mixing of concrete and similar also to tumble plating which is a method used in industry as a nonelectrolytic method of plating. The *tumbling* or milling of the carbide mixture tends also to reduce the particle size of the carbide and cementing material. The time of milling varies for achieving desired qualities. The milling time is greater for mixtures of low binder content. In some manufacturing processes the ball mill lining is of the same material as the binder of the cemented carbide. The binder is thus obtained from the lining of the ball mill. By predetermining the length of time of milling, the proper amount of binder is incorporated during the milling operation.



Following the milling of the tungsten carbide and cobalt mixture begins the actual fabrication. There are generally four methods of fabricating the cemented carbide. The basic fabrication process consists of (*a*) molding the powder and (*b*) sintering the carbide and binder. This process is analogous to pouring a concrete mold and then making provision for curing the cement binder.

One method of fabrication consists of a pressing operation in which the powders are given a definite form by placing them in

In the first method
Standard blanks are
molded individually
in an automatic
pill press
A separate die or mold is required for each size and shape of
blank

accurately ground molds and compressing them. Molding pressures used in this method vary and may be as high as thirty tons per square inch. This molding process is particularly suited to large quantity production as the dimensions of the semifinished product can be closely predetermined and the molding dies can be used to form a large number of pieces. The molded pieces are then presintered in steel containers at relatively low temperatures. The final sintering process consists of placing the pieces in graphite containers, leaving spaces between the pieces to prevent fusing of their binders. The graphite containers are then placed in furnaces at approximately 2650 F. The particles of cobalt are fused together and completely embed the carbide particles. The binder does not fuse with the carbide. The sintered pieces are then allowed to cool and are now semifinished products, requiring only finishing or attaching and finishing. Any shape that can be molded and is of correct design can be fabricated by this process.

Another process commonly used for fabrication is one that is well adapted to manufacturing cemented carbide products in limited quantities. This process consists of adapting standard molded shapes to custom specifications. The standard shapes are molded in the same way as previously described, that is under pressure and in a standard shape mold. The molded pieces, called ingots, are then presintered. After presintering, the ingots are machinable since they have a chalky consistency. In this state, they can be ground, turned, bored, cut with an abrasive wheel, drilled, and counterbored. The material at this stage can be held in a vise or chuck. After machining, the ingot can then be sintered and rendered usable.

A third way of molding is the extrusion method. In this method, the carbide and binder powders are mixed into a paste which is then placed in an extrusion machine. This process is similar to that of squeezing toothpaste out of a tube. The extruded product has the shape imparted by the shape of the nozzle or die opening. The extrusions are then dried, presintered, and cut into lengths. They may then be machined as in the previous method. Finally, they are sintered.

The fourth method of fabrication is one that is not widely used but is worth noting. It is defined as the hot press method. In this process, the mixed powders are molded and sintered simultaneously. The powders are placed in a carbon mold which is inserted between electrodes and heated by resistance. During the heating or sintering period, the powders are compressed with a carbon plunger. This method is adaptable for single piece production as the mold is easily made. However, the unit cost is high and the process does not lend itself to fabrication controls possible in the foregoing methods.

Properties of Cemented Carbides

The finished cemented carbides have remarkable qualities which make it a truly wonderful material. It is important to note at this point that the qualities of the finished product depend on the quality of the controls used in manufacturing the product. The final test of the product depends on the inherent properties of the cemented carbide, the proper selection of the grade best suited for the job to be done and finally, in the proper design and use of the tool whether used as a fabricating material or as a cutting or forming tool.

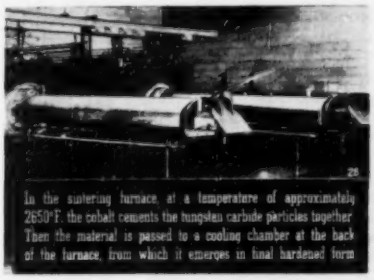
Cemented carbide is available today in many grades having varying properties for specific purposes. The product depends for its properties upon controls applied during manufacture and in predetermining the various quantities such as particle size, amounts of binder and auxiliary metals. Molding pressures, sintering temperatures, and process timing are also important control factors, as well as the furnace atmospheres. The resulting products are observed with suitable instruments to check hardness, grain structure, density, and transverse rupture or bending strength.

The basic physical properties of cemented carbides are:

1. Extreme hardness.
2. High wear resistance.
3. Resistance to corrosion.
4. High compression strength.
5. Brittleness or relatively low resistance to impact.
6. High red hardness.

The hardness of cemented carbide is probably its most valuable characteristic. It is generally known as the "hardest metal made by man." On Moh's scale of relative hardness, it ranks in hardness between silicon carbide and aluminum oxide, being harder than the latter. On the Rockwell and Brinell scales, the hardness is near the top of the scale, the exact hardness depending upon the particular grade being tested. The value of the relative hardness is easily recognized in that hardness

The molded blanks are then pre-sintered (fired) at a



In the sintering furnace, at a temperature of approximately 2650°F. the cobalt cements the tungsten carbide particles together. Then the material is passed to a cooling chamber at the back of the furnace, from which it emerges in final hardened form

determines the possible wide applications as a cutting material, bearing material, or wear resistant material.

The high wear resistance is a property derived from hardness and strength. The value of this property can be appreciated when it is shown that cemented carbide can maintain its cutting or wearing surface under conditions previously unheard of. The relatively high initial cost of cemented carbide is offset many times by reduction of replacement and maintenance costs. In some cases, the hardness factor is indispensable but in all cases the wear resistant qualities are invaluable assets. Resistance to corrosion is a very important property of this material. Corrosion can be the cause of extensive losses in regard to storing of cutting tools such as reamers and milling cutters. Keen steel cutting edges lose their sharpness by corrosion. Pitting of valve seats and nozzles in corrosive chemical handling equipment can be reduced through the uses of this material. Accurate measuring instruments such as parts of micrometer anvils are excellent examples of the application of this material to prevent corrosion of important surfaces as well as wear resistance.

The high compression strength and resistance to impact both compare favorably to fine tool steels. Both of these qualities give cemented carbide an interchangeability with fine tool steel in most instances where the application is properly designed. In combination with its other qualities, cemented carbide is often the most suitable cutting or forming material.

The high red hardness property is valuable where hard materials are cut at high speeds. In many cases where the cost of machining is prohibitive due to necessarily slow cutting speeds, the application of cemented carbide tools makes machining profitable.

As noted before, the carbide product is graded according to the manufacturers' codes. The grades are readily available from them. The grades vary from *soft* to *hard*. However, all of them are very hard as this range is very small. In general, products that have higher percentages of binder are tougher while those with less cobalt binder are harder but less tough. Further alterations of properties can be achieved through the addition of tantalum or titanium as auxiliary metals to the tungsten carbide. These are generally used in the grades recommended for machining steel.

Cemented carbides have a number of other desirable properties. Their torsional strength

is relatively high, compared to carbon steels, and but slightly less than that of alloy steels. They have a high endurance limit and stand up well where alternate stresses have to be sustained. Some grades have a high thermal conductivity which is an important factor in wear resistance where heat due to friction is involved. Another property of cemented carbides is their low magnetic permeability. As a result of this property, the material cannot be held by ordinary magnetic chucks for grinding. However, after fastening the carbide to a steel shank the carbide tool can be held by a magnetic chuck as usual.

Uses of Cemented Carbide

Cemented carbides are coming into greater and greater use in school shops as well as in industry. The vast possibilities in both are just now being tapped. The vocational school shop and the industrial-arts shop are being offered an ever growing number of carbide tipped tools to increase the versatility of the school shops and to adapt the students to industrial uses of cemented carbides.

In considering the adoption of cemented carbide in instructional units, one must consider the use to which the material may be applied. Generally, the applications can be classified into three divisions: (*a*) as a cutting tool material, (*b*) as a wear and corrosion resistant material, and (*c*) as a die material. The school shop may be concerned chiefly with cemented carbide as a cutting tool material. In highly specialized technical and trade course offerings, the fabrication of cemented carbide dies and wear resistant parts are becoming increasingly important.

Cemented carbide tools can be used in the industrial-arts shop to great advantage in acquainting students with general uses of the material. There are available a large number of tools which are common in many industrial-arts school shops. There are carbide tipped turning tools designed for use with the wood-turning lathe. A variety of materials can be turned in the wood-turning lathe with these tools including wood, plastics, alabaster, aluminum, brass, copper, zinc, and other soft alloys. This application of cemented carbide opens up many new areas in which industrial-arts students may explore. In the metal lathe area of the industrial-arts shop, the application of cemented carbide tools can be a potent source of arousing interest as well as providing a rich experience with this modern material. The use of carbide tipped drills and other miscellaneous tools, such as carbide tipped concrete drills, carbide tipped scribers, glass cutters, micrometers, and lathe centers, is recommended to increase the versatility of the shop and in some cases, to reduce maintenance and replacement costs. The use of these tools makes possible the teaching of a wide variety of processes and skills which are modern, effective, and informative. The presence of these tools in the industrial-arts shop is sure to evoke student interest which in turn, may open up new areas of related information and encourage the students to explore new processes, skills, and materials.

In the vocational school shop, cemented carbide tools are becoming a *must* since vocational schools have the responsibility of offering to students training which makes them potentially employable as skilled mechanics. The vocational school has an equal responsibility to industry in insuring a supply of men trained in the most modern methods of repair, maintenance, and production. Cutting tools of many kinds, when tipped or faced with cemented carbide, are used in a wide range of industries, among them metalworking, woodworking, automobile manufacture, etc. This "hardest metal made by man" is indeed becoming a familiar machine-shop tool.

It is to be noted at this point that working with cemented carbide tools often requires a reorientation of the student and, many times, of the machines to which the tools are applied. It is the experience of the writer after many years of using carbide-tipped tools, that students, as well as journeymen, having been trained in the use of conventional cutting tools, must be retrained in the use of this new material. Therefore, it is strongly recommended that training in the use of carbide tipped tools be started early, along with the teaching of conventional methods. The reason for this is that the student may develop skills in both methods through experiences which take place at about the same time. Thus, the student may make comparisons and establish relationships between both methods early rather than having to learn new skills which require radically different concepts or reorientation. This fact is very important and easily demonstrated. The cutting speeds which are applied to the various cutting operations are radically different in the two methods. The materials which can be efficiently and economically machined are of greater variety where carbide tipped tools are used. The feeds and depths of cut are also radically different. The techniques of applying coolants to carbide tipped tools in some operations must be radically altered. The techniques of achieving desirable work finishes are different. Reaming and milling with carbide tipped tools, as well as turning, require new skills. Finally, the care of carbide tools in use as well as in handling and storage require great care and increased knowledge.

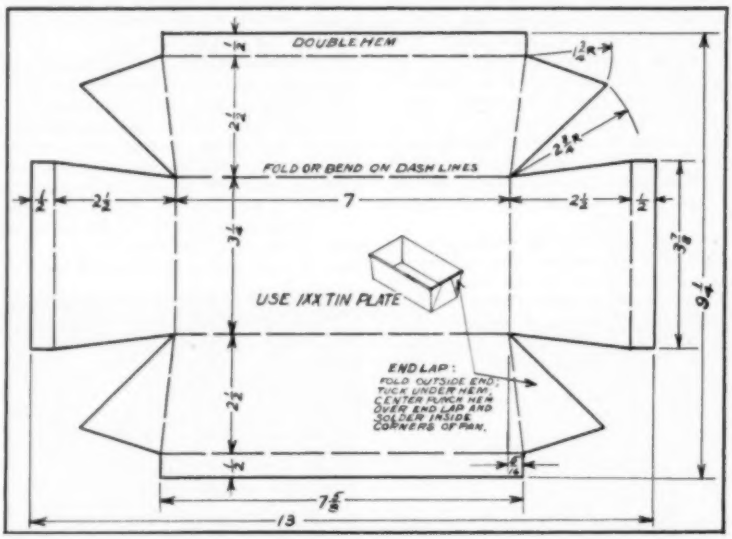
Because of the higher cutting speeds, greater feeds, and increased depth of cut it is important that the machine tools to be used are so designed that they are capable of handling the increased pressures upon the various parts of the machine. All bearings and spindles must be properly seated and maintained. Gibs must be kept at optimum tightness. Backlash in all gear trains should be held at a minimum. Finally, the machine tool should be accurately leveled and securely fastened to the floor. It is true, of course, that these precautions apply to all machine tools under any circumstance. However, as noted before, the increased loads require that greater care be applied for reasons of efficiency, the production of good work, reduced maintenance costs, and safety of the students.

BREAD PAN

CHARLES L. FRANK
High School
Brewster, Ohio

A request for a set of five small loaf pans for baking Christmas fruit cakes led to the development of this pattern.

It makes a very satisfactory project for elementary sheet-metal work. It does not require elaborate equipment. Very careful layout and cutting is necessary, however. Carefully



Development of bread pan

consider the order of operations when planning the work.

A set of these will be well received by any mother whose boy likes home-baked bread.

ENGLISH FOR TRADE AND VOCATIONAL SCHOOLS

J. ALLEN MORRIS
Murray Vocational School
Charleston, S. C.

(See preceding articles in January, September, and November, 1948, and January, 1949, issues)

Uses of Capital Letters

Since many of our students need to know much more about how to use capital letters correctly, considerable attention is devoted in helping them to learn how to apply the rules on capitalization.

In the first year's work only the simplest of these rules are stressed; each is treated as a separate *job* so that the student receives more or less work on each rule in accordance with his knowledge of it as shown in drill and written work. Short tests, work on addressing envelopes, friendly letters, simple business letters, and themes keep the subject of capitalization always in the student's mind. The rules studied and learned in this first year concern using capital letters for names of days of the week, months of the year, streets, cities, and countries, automobiles, and names of Murray Vocational School shops. When a boy has finally mastered these, he is ready for the work of the second year.

In the second year's work, two new uses of capital letters are introduced: names of stores, companies, factories, schools, colleges, organizations of all kinds; and in titles of books, themes, stories, etc. If a student makes a mistake in a rule previously studied, he is required to study the rule again and to do a small amount of *make-up work* writing (10–25 times) with a capital letter the word missed. Most of the mistakes are caused by carelessness rather than by a lack of knowledge of rules, and such make-up work tends to focus the student's attention on his worst mistakes and to make him more careful about checking his work before turning it in.

In the second year considerable stress is placed on the writing of simple business letters, a number of themes, and practice sentences for learning about appositives. As these review the work of the first year and bring out in the student's work the two rules mentioned in the preceding paragraph, no special sheet on capitalization is used during this year.

In the junior year, two comprehensive tests on the use of capital letters, are inserted. If a boy's work shows that he obviously does not need more than one drill, he is excused from writing the second. On the other hand, if he does both drills and is still weak on capitalization, he is given extra work until his work shows a satisfactory improvement. No particular rules are considered as objectives for this year, but each boy must learn those he does not know when he takes the comprehensive tests. In this year each junior learns to write standard business letters and also takes the final test on appositives. These supply additional work on capitalization — enough to end almost all errors in using capital letters before a boy begins his senior work.

To be sure that each senior knows all the rules that are considered essential, one final comprehensive test is given before he is permitted to graduate. The difference between the work of a first-year boy and that of a senior is almost startling: the former is ignorant, careless, and inept; the latter, sure of the rules, neat and accurate, and mature.

As the rules for capitalization are easily obtainable, the special explanation sheets which have been prepared for the students, are not included here. As a sample of the type of work-sheet used, the following is typical:

Capital Letters

1. tom and his father returned to charleston from new york in june
2. while working in a parking lot i drove fords cadillacs and buicks
3. monday tuesday and wednesday are his busy days in march april and may
4. dr harold easterby professor of history at the college of charleston lives on rutledge avenue in charleston s c
5. he gave his friends subscriptions to colliers liberty and boys life
6. people who live in the north are little different from those who live in the south
7. my brother likes chemistry and history but does not like english french and mathematics
8. after harry was graduated from murray vocational school he started to work for the cameron and barkley company in charleston s c
9. mr winter instructor in the electric shop asked is the picture for todays assembly ready yet
10. sams mother asked him when did you come home last night
11. the three boys went to the office to talk with mr john h clark principal of murray vocational school
12. this pontiac is in bad shape it needs a complete overhaul
13. have you ever seen the new philco portable radio
14. i shall be looking for you at my office in the peoples building on broad street next tuesday october 22 at 3 o clock
15. the american oil company operates a number of oil fields in mexico and south america

Each instructor can easily prepare as many work sheets as he needs, adapting them to the special needs of his students.

One very useful sheet which helps the overzealous but ignorant beginner who scatters capital letters at random throughout his work is the following:

Avoiding Overcapitalization

Small letters should be used for:

1. Words relating to trades or professions (or jobs): electrician — carpenter — auto mechanic — machinist — draftsman — patternmaker — welder — typist — clerk.
2. School subjects (except languages, which are capitalized): history — mathematics — science — drawing — auto mechanics.
3. Names of sports: football — baseball — tennis — swimming — fishing.
4. Names of tools (except patented trade names): hammer — chisel — plane — saw — file.
5. Words relating to members of one's family: mother — father — uncle — brother — sister.
6. Words expressing direction: north — east — south — west.
7. Seasons of the year: winter — summer — spring — fall.

Use small letters for the words "and" and "but." Try not to start sentences with "And" and "But."

Not: Tom broke a chisel. And he had to pay for it.
Better: Tom broke a chisel, and he had to pay for it.
Not: Bill tried to get the job. But he was not old enough.
Better: Bill tried to get the job, but he was not old enough.

Perhaps I should mention that all capitalization work is used to help each student learn rules of punctuation, many of which are deliberately worked into the capital-letter drills.

(To be continued)

At a time when the whole idea of a free society is being attacked by selfish interests in many parts of the world, it is especially important that we see ourselves clearly so that we can pass judgment on the plans of those amateur mechanics who want to take our social and economic machine apart — and who might leave us by the side of the road with some important gears missing. — *Benson Ford.*

ELEMENTARY AUTO MECHANICS

FRANK B. MILLER
Central High School
Tulsa, Okla.

(Continued from page 58A of the March, 1949, issue)

Assignment Sheet No. 39 — Removing a Motor Block

Why this is done:

For cleaning and reconditioning a motor block, or for replacing a cracked block, it is more convenient and economical to remove the block from the crankshaft where possible.

Procedure:

1. See that all accessories are removed from the block.
2. Remove all bolts or nuts fastening the block to the crankcase. Check carefully to see that no bolt has been overlooked.
3. Fasten a chain to the block at the center of its weight and get instructor's check.
4. Lift the block up with the hoist, checking carefully any failure to separate.

NOTE: Care must be taken to lift straight up so that the block will not bind on the sides of the studs, and some readjustment of the chain and hoist may be necessary to accomplish this.

5. Clean off the contacting surfaces of the block and crankcase.
6. When block is ready to replace, see that all pistons and rods are removed, insert gasket and drop block in place.
7. Start all nuts and bolts before tightening down any one.
8. Tighten down the nuts and bolts gradually a few turns at a time, rotating around the block until all are drawn down tightly.

Questions:

1. What would happen if a block were pried up with one bolt still in place?
2. Why not replace block with the pistons and rods installed on the crankshaft?
3. Why not tighten down the first bolt before starting the rest?

Text reference: ....

Assignment Sheet No. 40 — Removing Clutch Housing

Why this is done:

For removal of the clutch and flywheel it is sometimes necessary to first remove the clutch housing.

Procedure:

1. Check to see that all attachments are removed from the flywheel housing, particularly starter.
2. Check to see whether housing or flywheel should be removed first and proceed accordingly.
3. Remove the flywheel underpan if separate.
4. Remove all bolts fastening the flywheel housing to the crankcase, excepting the two top bolts.
5. Make arrangements to support the housing when it is separated.
6. Remove the two top bolts and lower the casting carefully to the floor.
7. Wash out the housing with kerosene.
8. After inspection and other work has been completed, replace the housing and bolt in place.

Questions:

1. What would happen if the housing were dropped?
2. What would result from attempting to pry off the housing when one bolt has been overlooked?
3. Why wash out the flywheel housing when it does not carry any lubricating oil and is sometimes more or less open to the air?

Text reference: ....

Assignment Sheet No. 41 — Tracing a Motor's Oil System

Why this is done:

In order to fully understand the duties of an oil system in a motor and how it performs these duties, it is necessary to have in mind a picture of the various lines and openings making up the entire system.

Procedure:

1. Examine a motor that has had the oil pan and oil lines removed, and trace the path of oil from the pan to the various points to be lubricated.
2. List each of the various points in a motor that have to be lubricated and tell what path the oil takes to get from the oil pan to that point; and from there back to the oil pan.
3. Hand in report on step No. 2, giving Motor No. and name.

Questions:

1. What are the two common forces used to cause oil to flow to the various points to be lubricated?
2. Name the three common kinds of oil systems in use today and tell how far the oil is carried under pressure in each case.
3. What is the immediate result of stoppage of an oil line?

Text reference: ....

Assignment Sheet No. 42 — Removing and Replacing Oil Lines and Pump

Why this is done:

It is necessary to remove oil lines and pumps, in order to remove pistons, crankshafts, and other parts, and also to clean out the oil system.

Procedure:

1. Remove the main oil lines leading from the pump, taking care of all gaskets.

CAUTION: Use only wrenches of the correct fit to avoid rounding off copper fittings.

2. Remove the oil pump.
3. Remove all auxiliary oil lines.
4. Clean out all lines by running wires through, flushing with kerosene and blowing out with air.
5. Clean out all oil lines running through the shafts and motor castings in the same manner.
6. Disassemble and clean out the oil pump.
7. Disassemble and clean out the by-pass valve, replacing any broken springs.
8. Assemble pump and by-pass valve and reinstall on motor.
9. Replace all lines, drawing joints up carefully to avoid leaks.

Questions:

1. Give at least two reasons why oil lines are made of copper.
2. What would happen if the oil by-pass valve failed to release? What if the spring lost its tension completely?
3. What causes oil lines to stop up? Where does this material come from?

Text reference: ....

Assignment Sheet No. 43 — Cleaning Out the Water Jacket

Why this is done:

With the operation of a motor and the resultant heat, the water in the cooling system is always depositing impurities in the water jacket. To keep up the circulating efficiency of the cooling system, it is necessary to clean out the water jacket periodically.

Procedure:

1. Remove any expansion plates from the side of the block.
2. Remove the inlet and outlet castings from the block.
3. Pull out any molding wires visible in the water jacket holes.
4. With a long steel scratch awl, pick loose all rust and deposited material that you can reach.
5. Scrape and blow this material out of the jacket with putty knives and a hand bellows.
6. Replace plates and castings.
7. Clean out the water jacket in the cylinder head by the same methods.

Questions:

1. What is the purpose of the expansion plate found on the side of some motor blocks?
2. What would happen to a motor block that was never cleaned out?
3. Why does heat cause the deposit of impurities? Would this happen if you used distilled water in the radiator?

Text reference: ....

(To be continued)

POLISHING PLASTER MODELS

SIMON S. PALESTRANT
Bronx, N. Y.

Plaster of Paris castings and models may be buffed to a high luster if first allowed to soak for about 15 minutes in a very soapy solution. It is removed, allowed to dry, and then rubbed briskly with a piece of soft flannel or cheesecloth.

CUTTING BOTTLES AND JARS

Jesse E. Rathbun
Portola Junior High School
San Francisco, Calif.

There are numerous methods used more or less successfully to cut glass bottles and jars. There are many uses to which such work can be applied. Often teachers find the satisfactory method too much of a task for common practice.

Try the following method. It is simple and has proven highly satisfactory. Scratch a line around the bottle, with a file, at the desired place. Fill the bottle exactly to this line with a medium-weight machine oil. Heat a solid iron rod, about ¼ to ⅜ in. in diameter, to a dull red and place the end into the oil. The bottle will crack at the line. The sharp edges should be ground off with a fine stone. The top of the bottle may be used as a funnel.

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Complete with 5 H.P. 3-phase or 3 H.P. Single Phase Motor and Switch f.o.b. Leetonia, Ohio

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Rips and cross-cuts stock 4⅛" thick!

At 45° tilt, blade takes 2⅞" cut!

Cuts a dado 1¹⁵⁄₁₆" wide!

LOOK!

You get the capacity of a 16" saw . . . in this big, new DELTA® 12" Tilting-Arbor Saw

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Built for safety, accuracy, economy, and convenience!

- ✓ Finish-ground table is 3'2" x 4'. There's plenty of room in front of the blade — full 16 inches at maximum cutting capacity.
- ✓ Scale magnifier lens makes it easy to set rip fence accurately and quickly.
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- ✓ T-slots on either side of saw blade hold miter gage securely, even beyond front of table. Miter gage cannot twist or fall out.
- ✓ "Auto-Set" Miter Gage has individually-adjustable index stops.
- ✓ "Super-Safe" Blade Guard has basket that pivots with work so that blade remains covered but view is unimpaired. Guard tilts with blade.
- ✓ Welded steel cabinet encloses working parts.
- ✓ Saw arbor is carried on lubricated-for-life ball bearings.
- ✓ Motor mounting takes either Standard Delta or NEMA frame motor.

You can use it to teach many operations:

- Straight ripping
- Cut-off work
- Compound angular cutting
- Grooving
- Dadoing
- Mouldings
- Angular cutting
- Rabbeting

Yes, this heavy duty saw is useful for many classroom assignments. But it gives you more than versatility alone:

This 12" saw provides the kind of advanced engineering features that machine-tool users have come to expect from Delta. The panel at the left shows just a few of them.

Because of Delta features like these, you can submit a lower budget figure for operating and maintenance expense.

Look for the name of your Delta Distributor under "Tools" in the classified section of your telephone directory.

Students can do more accurate work. And they can do it with maximum safety.

Your nearby Delta distributor has a Delta 12" Tilting-Arbor Saw on his display floor. Inspect this big-capacity machine there now. Ask your distributor about buying on easy time payments.

Send coupon for descriptive Bulletin No. AD-448.

(This machine also available through Crescent Division dealers.)

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5-49A

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Personal News

DR. BAWDEN WEDS MISS FIRTH

On Saturday, April 16, 1949, Dr. William T. Bawden was married to Miss Maude Mary Firth, at 3:00 p.m., in the Thorndike Hilton Chapel on the University of Chicago campus, Chicago, Ill. Dr. Bernard Iddings Bell, Canon in the Episcopal Church, read the service.

Miss Firth has been director of home and family life education in the secondary schools of Tulsa, Okla., since 1924. Her work there has attracted nationwide attention.

Dr. and Mrs. William T. Bawden

Dr. Bawden's outstanding work in the fields of industrial arts and vocational education is so well and so generally known that his many contributions need not be repeated here. He will continue in his position at Kansas State Teachers College, Pittsburg, Kans.

His many friends all over the United States wish him and his good wife many pleasant years of conjugal happiness.

WISCONSIN'S RETIRING SUPERINTENDENT OF PUBLIC INSTRUCTION

John Callahan, 83 years old, will retire at the end of his term in June, after serving 28 years as state superintendent of public instruction.

About 350 persons, most of whom were school administrators and teachers, attended a dinner in his honor at Milwaukee, Wis., on March 21, 1949.

Tributes were extended by John Guy Fowlkes, dean, School of Education, University of Wisconsin; O. H. Plenzke, secretary, Wisconsin Education Association; and George Denman, superintendent of schools, Green Bay, Wis.

They all lauded Mr. Callahan as a farsighted, hard-working educator, who dreamed and performed big deeds for the people, especially the young people of Wisconsin. They praised his leadership, his fairness, and his affability. They said that he fought for higher salaries when his own was shamefully low.

When he finally arose to make his response his speech plainly showed his modesty and his appreciation of the things that had been said about him.

He merely said:

"I don't feel like making a speech. A lot that has been said here has been overstated. I am not the best superintendent this state ever had. If you want to know who that was, I can tell you. He was L. D. Harvey (superintendent from 1899 to 1903), who accomplished more in four years than any other superintendent ever did. But thank you. I'll never forget this as long as I stay in this world."

A volume of letters from friends; a pin representing his 35 years of membership in the Elks lodge of Menasha, Wis.; a certificate from the Buccaneers, a social group which he had helped to organize, and of which he had been the first president; and a check to defray future travel expenses were then presented to him, thus closing an evening that was both happy and sad.

♦ JOHN P. WALSH, formerly director of vocational and adult education, Gloversville, N. Y., has accepted a position as director of Trade Schools in the State Education Department, Concord, N. H.

♦ MILFORD T. SEAMAN, formerly a teacher of auto mechanics at Kingston, N. Y., accepted a position as a teacher of engine maintenance and repair, and related subjects in the State Agricultural and Technical Institute at Alfred.

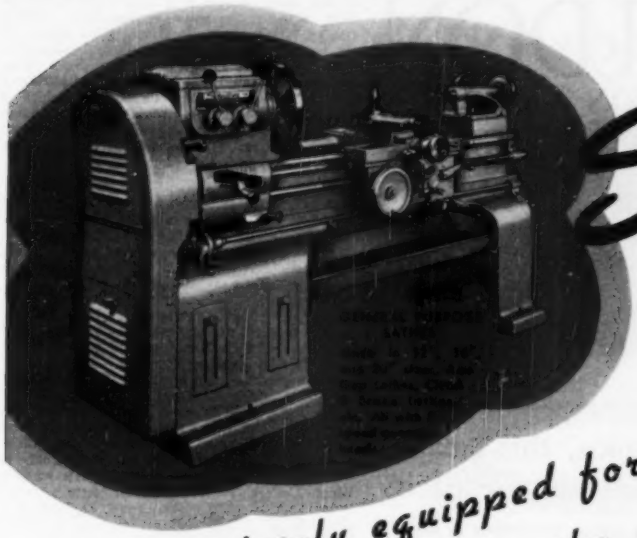
♦ GEORGE E. LINTON, chairman of textile department, Fashion Institute of Technology, has been elected president of the American Association of Textile Technologists. Dr. Linton has taught textile courses in several colleges and universities and is the author of several publications.

♦ DR. EDGAR REYNOLDS SMITH, chief of the physical chemistry section of the National Bureau of Standards, has been awarded the 1948 Hillebrand Prize of the Washington Section of the American Chemical Society. Dr. Smith was cited for his "original work in physical chemistry, more especially contributions to electrochemistry and ebulliometry."

♦ CLYDE RAY BAIRD was appointed assistant professor of psychology and vocational counselor in the guidance bureau, in August, 1947, at State Teachers College, Pittsburg, Kans.

♦ WALTER A. BOWMAN was made instructor of welding, woodworking, and drafting, at State Teachers College, California, Pa.

(Continued on page 26A)



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✓Completely equipped for thorough training
✓Value leader in the medium-price field

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BIG LATHE FEATURES MAKE THE SEBASTIAN "FIRST IN TEACH-ABILITY"

Following are some of the outstanding superior features of Sebastian Lathes:

- TIMKEN TAPERED ROLLER BEARINGS on all shafts in headstock.
- OVERSIZED, HEAT-TREATED STEEL GEARS in headstock.
- APRON CONTROL for start, stop, and reverse of lathe spindle. (Standard on lathes with 10', 12', and 14' beds.)
- REVERSE IN APRON for feeds.
- ACCURACY .0005" at every point of alignment.
- 57 FEED AND THREAD CHANGES.
- TAPER GIBS throughout.
- AUTOMATIC SPLASH LUBRICATION for all gears in headstock.
- LARGE HOLE through spindle.

ALL OF THESE ITEMS ARE SUPPLIED AS STANDARD EQUIPMENT, INCLUDED IN BASIC LATHE PRICE:

MOTOR & WIRING • REVERSING SWITCH • TOOL POST
COOLANT PANS • SPINDLE SLEEVE • CABINET LEG
THREADING DEPTH STOP • LEVELING SCREWS & PLATES
FACE PLATE • DOG PLATE • CENTERS • WRENCHES

In addition to above items, Apron Control and Center Leg are also included as standard equipment on lathes with 10', 12', and 14' beds.

Students trained on a Sebastian Lathe are right at home when they start work in a machine shop. Often they're called upon to operate another Sebastian, widely used throughout industry. And even on big, expensive engine lathes, they find no construction or operating feature essentially different from what they're familiar with in a Sebastian.

Typical is the time-saving Sebastian 2-Station Control—one control at the apron, the other at headstock. The Apron Reverse has operating handle right on the apron. Other outstanding Sebastian features and items furnished as standard equipment are listed at the left.

Built to traditional King standards of quality and precision, the modern Sebastian offers definitely "more lathe for your money." Write today for new Catalog S-1, featuring Standard Type "R" Sebastian Lathes. Make your own comparisons . . . we're confident you'll find the Sebastian best qualified for student training.

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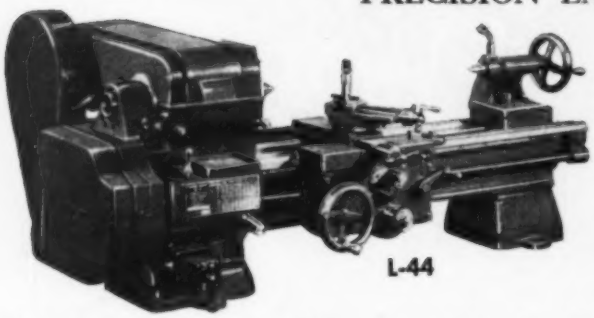
SHELDON
PRECISION LATHES



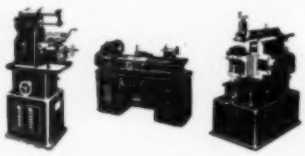
L-44

If Handicapped for Space or Funds, this smaller *SHELDON* will give *MAXIMUM* shop capacity

If you are faced by space limitations or size of appropriation, you can still give a practical course in lathe operation. Smaller, less expensive, the Sheldon L-44 lathes are of standard industrial type, capacity, and precision.

They have 10⅛" swing, ¾" collet capacity, large industrial type Timken Taper Roller Bearing, and a sturdy 44" bed that is held to .0005" tolerances of parallel and longitudinal alignment. They have standard industrial controls, full quick change gears and a completely enclosed motor drive — yet cost only $472.00.

Write for Sheldon Machine Tool and Accessory Catalog or send 75¢ for Sheldon's simplified beginners text, "Care and Operation of the Lathes."



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PERSONAL NEWS

(Continued from page 24A)

♦ JAY BORDEN is located at Punta Gorda, Fla. He is in charge of industrial arts in a County and Vocational School.

♦ FRANK E. ROBINSON is teaching general shop at the State Teachers College in Oswego, N. Y.

♦ HENRY J. STUBBA has been appointed director of industrial education at Passaic, N. J.

♦ JOHN HEIKKILA, industrial-arts teacher, Babylon, N. Y., and for many years a leader in industrial arts on Long Island, died in December.

♦ EDWARD W. MOY, a graduate of Oswego State Teachers College, Oswego, N. Y., has been appointed to the industrial-arts department of the Ithaca public schools, Ithaca, N. Y. Mr. Moy is teaching in a new general shop at the Boynton Junior High School, for a slow learning group for whom a double period of industrial-arts shop is provided.

♦ Recent appointments to positions as first assistants in New York City vocational high schools are the following: BETTY QUINN WAGNER, home nursing, Brooklyn High School for Homemaking; ESTHER SKELLEY, home nursing, Yorkville Vocational High School; MARGUERITE DOLAN, beauty culture, Mabel Dean Bacon Vocational High School; ROBERT G. ROMMER, health education, George Westinghouse Vocational High School; ANN WICKMAN, health education, Central Commercial Vocational High School; DOROTHY ZIRBES, health education, Central Needle Trades High School; ERWIN WIDMANN, related technical, East New York Vocational High School; CARYL E. COHEN, social studies, East New York Vocational High School; SOLOMON HOLT, social studies, George Westinghouse Vocational High School. S. GRANT CONNER, professor, industrial education, State Education Department, New York City, has accepted the directorship of the Andre' Bulova School of Watchmaking. This school, which is generously endowed, has provided free instruction to selected disabled veterans since its establishment several years ago. An expanded program is being developed to serve the jewelry trade.

SUPERINTENDENT L. P. GOODRICH DIES

Lowell P. Goodrich, superintendent of the school system of Milwaukee, Wis., since 1943, and member of the Milwaukee board of vocational and adult education, died of a heart attack at his home at 2:12 a.m., Tuesday, March 29, 1949.

Mr. Goodrich's death came as a great shock to everyone, as he seemingly was in the best of health and had attended two separate sessions of school board committees from 8:00 p.m. to 11:00 p.m., Monday evening.

He came from pioneer stock. His grandfather, Wyklif Goodrich, who came to Wisconsin from Maine in the 1840's, founded and taught a "Select School" at Rochester, Wis. His father, Rudolph O. Goodrich, also was a teacher.

Lowell P. Goodrich attended the schools of Ripon, Wis., and took his undergraduate work at Ripon College. He received his master's degree from the University of Wisconsin, and did more postgraduate work at Harvard and Columbia Universities.

Lowell P. Goodrich

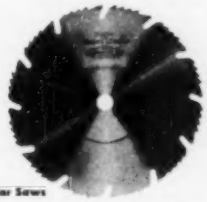
After graduating from Ripon College, he taught chemistry for 2 years at the high school at Wausau, Wis. Then he served as school superintendent at Phillips, Wis., for 3 years, after which he served in a like capacity at Ripon for 5 years, and then accepted the superintendency at Fond du Lac, Wis., for 17 years. He was made assistant superintendent at Milwaukee in 1940, and was chosen to succeed Milton Potter as superintendent, when the latter retired in 1943.

He was active in civic affairs and was ever ready to give of his time and energies to help further any movement for the betterment of the education and welfare of the young.

He is survived by his wife, a son, William P., who is an attorney in Ripon, and a sister who is a teacher in the Fond du Lac school system.

One out of every 14 persons in the U. S. suffered a disabling injury in 1948. — *National Safety Council.*

DISSTON'S duty···better tools


DeLuxe Circular Saws

for better duty in school shops

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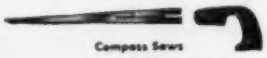
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Industrial Arts Instructors constantly preach the value of high standards of workmanship. Among their foremost aids are top-grade tools in the school workshop. And that is why so many in the profession specify *Disston Tools.*

Count on Disston Steel for cutting edges that stay sharp longer. Count on matchless Disston skill for products designed to defy severe usage. See your students encouraged as they work more confidently with Disston Tools.

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The Disston Saw, Tool and File Manual with its wealth of "How to do it" information, invites reading. Free copies are gladly supplied by hardware retailers. Or students may write us direct.

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Disston Wall Charts illustrate the proper use and care of tools—graphic aid in your daily school work. Furnished free. Simply write us.

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No. 20 consists of one Hercules Punch complete with two Tauber Slot-Hole Dies and several thousand Tauber Tubes and Multi-Rings in red, white and blue colors, in a range of several popular sizes. These Tauber Tubes and Multi-Rings are illustrated below.

Tauber Tube is easily inserted and locked by hand. It is available in red, white or blue in several sizes. It remains closed even with hard usage, yet is easily opened for insertion of pages.

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Association News

♦ The annual conference and dinner of shop and drafting teachers in the Chicago public schools will be held on May 20, at the Schurz High School. The conference will enable some 450 teachers of unit shops and drafting an opportunity to exchange ideas, discuss educational trends and methods, and to learn of industry's needs and problems from industrial leaders in the Chicago area.

One of the unique purposes of the conference is to pay homage to shop and drafting teachers, who have or will retire, at the age of 65, during the current school year. The majority of the retiring men have taught shop or drafting for over 30 years.

Special tribute will be paid to Philip L. McNamee, who retired on January 28, 1949, as assistant superintendent of the department of vocational education. Mr. McNamee established a national reputation in the development of Chicago's outstanding vocational education program.

The conference program calls for separate meetings of teachers of various shop subjects. Following the annual dinner, all of the conferees will assemble to enjoy a special program, featuring addresses by prominent educators and industrialists.

♦ The 24th Annual Conference on Printing Education of the National Graphic Arts Education Association will be held at the new Technical Trade School, Pressmen's Home, Tennessee, June 20–23, 1949. The list of speakers to date includes such outstanding leaders as Carl E. Dunnagan, president, Printing Industry of America; Wade E. Griswold, director, Lithographic Technical Foundation; Colonel E. W. Palmer, president, Kingsport Press, Kingsport, Tenn.; and George Welp, International Printing Ink; as well as leaders in the educational field.

A special feature will be the visits to the Kingsport Press, Mead Paper and Pulp Corporation, and Holliston Mills of Tennessee — all at Kingsport, Tenn., and the International Playing Card Company, Rogersville, Tenn.

The general arrangements for the conference are in charge of the following committee appointed by John G. Henderson, president, National Graphic Arts Education Association; Thomas E. Dunwody, director, Technical Trade School, Pressmen's Home, Tenn.; C. Harold Lauck, Journalism Laboratory Press, Washington and Lee University, Lexington, Va.; and Fred J. Hartman, educational director, National Graphic Arts Education Association, Washington, D. C.

♦ The New York State College for Teachers at Buffalo, N. Y., is holding the annual spring Industrial Arts Conference on May 2 and 3 in the industrial-arts building. As in other years, it is being sponsored and organized by Epsilon Pi Tau.

This conference, which is organized under the theme "Industrial Arts Serves Progress," will have its opening address on Monday, May 2, at 9:00 a.m., in the college auditorium, and will continue through both days. Monday evening there will be an Epsilon Pi Tau Initiation Banquet at the Hotel Lennox. All Epsilon Pi Tau members are cordially invited to attend.

♦ At the annual election night banquet of Mu Sigma Pi, of Wayne University, Detroit, Mich., held on January 14, 1949, the following officers for the coming year were elected: president, Norman Reckling; vice-president, Harlan Arthur; member of the executive board, Ken Jackson.

At this meeting Dr. Ralph L. Lee of the General Motors Corporation, gave a very inspiring talk on "Leadership — and What it Takes."

♦ Leaders of all branches of the forest products industry will hold the Third Annual National Meeting of the Forest Products Research Society at Grand Rapids, Mich. The meeting, to be held in the Grand Rapids Civic Auditorium on May 2, 3, and 4, is expected to bring together more than 500 men from the production line and the research laboratories to discuss their mutual problems.

Registration will open at 4:00 p.m., on Sunday, May 1, in the lobby of the Pantlind Hotel. Registration Monday will be at the auditorium.

♦ The 37th National Safety Congress and Exposition will be held in Chicago, Ill., October 24 to 28, 1949. School and College sessions will be held at the Morrison hotel.

Highlight — Fourteen boys and girls from 7 cities in various parts of the country will discuss "Students Evaluate Driver Education and Training — And How!" Joe Kelly of "Quizz Kids" radio fame will be moderator.

Other Meetings — Daytime: two general sessions for all delegates; two meetings devoted to safety education at the elementary level; two meetings devoted to safety education at the secondary level; one meeting devoted to safety education at the higher level; two meetings devoted to driver education and training; a reception for all delegates.

Meetings — Night: one meeting conducted by safety education supervisors in the public and parochial schools of the nation; one evening devoted to the showing of new safety films; one evening devoted to the annual banquet; one evening devoted to the Fun Fest!

♦ An institute for teachers of mathematics, sponsored by the Association of Teachers of Mathematics in New England, will be held August 23 to 30, 1949, on the Wellesley College campus, in Wellesley, Mass.

Henry W. Syer, 84 Exeter St., Boston 16, Mass., is general chairman.

♦ The Indiana Industrial Education Association will hold its meeting at Turkey Run State Park, Ind., on April 28, 29, and 30. The officers of this association are: president, William Baker, Columbus; secretary-treasurer, H. G. McComb, State House, Indianapolis, Ind.; exhibits chairman, Gordon Johnson, Short Ridge High School, Indian-

(Continued on page 31A)

Teach your students how scientific use of the energy in color reduces eye fatigue, accidents and absenteeism — improves quality and quantity of production.

TRAINING of skilled shopmen is no longer limited to teaching them about metals, machinery and methods. More and more industry is recognizing the influence of physical and psychological factors upon workmen.

That is why so many educators in our industrial and vocational schools now include Pittsburgh's COLOR DYNAMICS in their courses.

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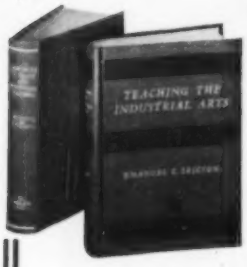

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Vincennes, Indiana

ASSOCIATION NEWS

(Continued from page 28A)

apolis, Ind.; and reservation chairman, Dennis H. Price, Indiana State Teachers College, Terre Haute, Ind.

♦ An Institute for Teachers of Drafting, sponsored by Wayne University and the University of Michigan, will be held August 8 to 19, 1949. For further information write to the Department of Industrial Teacher Education, 467 W. Hancock, Detroit 1, Mich.

♦ The Connecticut Industrial Arts Association 16th Annual Spring Conference was held on April 8 and 9, 1949, at the Teachers College of Connecticut, New Britain, Conn.

Adhering to the theme, "Guidance through Industrial Arts," the two panel groups on Friday afternoon and Saturday morning were helpful and constructive.

At the Friday morning session Erwin M. Harris represented the general metals group; Gordon S. Hill, the general shop; H. O. Sundberg, the general wood; and Donald J. Tracey, the graphic arts group.

At the Saturday morning session the same men, just listed, represented the same areas at the panel meeting as on Friday.

At the banquet on Friday, and at the luncheon on Saturday, Edward C. Lyon acted as toastmaster; and James J. Hammond was the speaker on both occasions. Mr. Hammond is the director of industrial arts, and associate professor of education at the State Teachers College at Fitchburg, Mass.

He also is the consultant in industrial arts for the state of Massachusetts, and in this capacity, has conducted numerous surveys in the state.

♦ The annual convention of the Ohio Industrial Arts Association was held at the Deshler-Wallick Hotel, Columbus, Ohio, March 24, 25, and 26, 1949.

The chairman of the Thursday afternoon session was W. F. Dunton, supervisor of industrial education, Public Schools, Piqua, Ohio.

At this session the local administrators of vocational education and industrial arts surveyed the topics of "Supervision of Industrial Education," with Earl L. Bedell, divisional director of industrial arts and vocational education of Detroit, Mich., as consultant.

The chairman of the Friday morning session was David P. Wherry, instructor of industrial arts in the Cincinnati school system.

The subject, "Industrial Arts in the Elementary School," was presented by Carl Hamburger, supervisor of industrial arts, Cleveland, Ohio.

A trip to the Lustron Corporation, manufacturers of steel fabricated homes, had been arranged for 10:45 a.m.

Dewey F. Barich, president of the Ohio Industrial Arts Association, was chairman of the annual business meeting at 2:00 p.m. Friday.

At the 3 o'clock session the subject of plastics was discussed. H. F. Edgar, industrial-arts teacher at the high school of Wauseon, Ohio, was chairman, and the speaker was Garfield W. Weller, Rohm & Haas Co., Philadelphia, Pa.

William R. Mason, supervisor of industrial arts, Cleveland, Ohio, was chairman of the Saturday morning session. The topic assigned was "Aluminum Work in Industrial Arts," which was presented by Douglas B. Hobbs, of the Aluminum Company of America, in his own inimitable way.

At the dinner at 6:30 p.m. on Thursday, Dewey F. Barich presided.

Earl L. Bedell, Detroit, Mich., was the main speaker, and his subject was "Our Responsibility to Youth."

Richard Knight, director of industrial education, Columbus, Ohio, was chairman at the Friday dinner. Mack Sauer, humorist, author, and lecturer, Leesburg, Ohio, entertained those present with his talk on "Rambling and Rumbling."

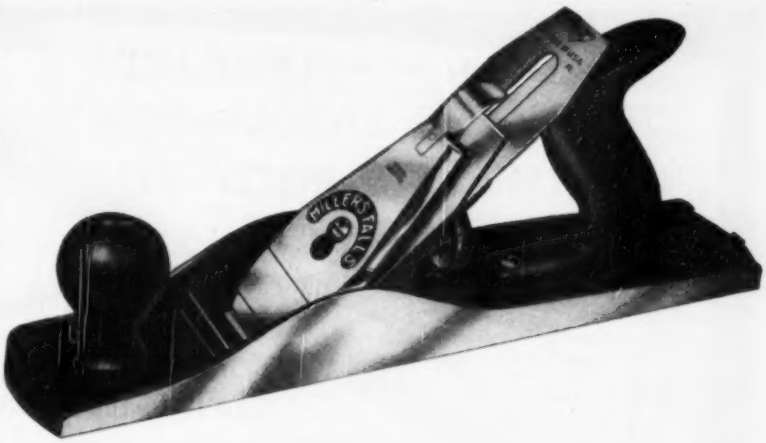
The Ship's program was given on Saturday morning. M. Leggett, supervisor of industrial arts, Medina, was chairman. The awarding of prizes was under the supervision of deck officer B. O. Bartee of the Brodhead-Garrett Co., Cleveland, Ohio.

♦ At the recent Georgia Education Association meeting in Macon, Ga., the industrial-arts division met and elected L. M. Burke of Atlanta, Ga., as president; James McCleary as vice-president; Glynn Sowell as secretary-treasurer.

A. M. Reinhold participated as delegate from the Greater Atlanta area.

Plans for next year include a revised state personnel list, larger membership, and expanded local programs throughout the state.

Deeds test the adequacy of plans. Judgment grows from evaluated experience. The wise teacher knows when to control . . . when to release. — *From Teaching Progress, Milwaukee Public Schools.*



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News Notes

♦ During the war, the Sheffield Corporation, Dayton 1, Ohio, prepared a number of sets of classroom charts bound in a rigid easel cover to aid in teaching inspectors the importance of gauging equipment and how to use it.

The entire package is entitled "Dimensional Control, Theory and Industrial Application." A 24-page booklet is included as the instructor's outline. There are 46 charts, 27 by 32½ in., and the set in its carton weighs 16½ lb.

Much of the information is still current and will be of help to students and trainees.

(Continued on page 39A)

"EldoradoStats are the best testing material I have discovered. We think highly of your Typhonite Eldorado and we've tried all makes."

"My fellow teacher's use your EldoradoStats and say the problems are extremely helpful and informative. I would like to add that we use Eldorado Pencils in our classes and find them very good."

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What could be better... than this kind of letter!

Judging by the thousands of letters we receive every month, our Eldorado Problems and Solutions are doing a real job of service for industrial arts students and instructors. And we're hearing equally enthusiastic things about Eldorado drawing pencils. Pupils and teachers everywhere say Dixon Typhonite Eldorado just can't be beat for giving good clean lines. They sharpen evenly, hold their points longer. Dixon is happy to continue this service — happy that you like Eldorado pencils. If you're not already receiving the EldoradoStats, just drop us a line today.

DIXON'S TYPHONITE ELDORADO

School Bureau, Pencil Sales Dept. 128-J5, Joseph Dixon Crucible Co., Jersey City 3, N. J.

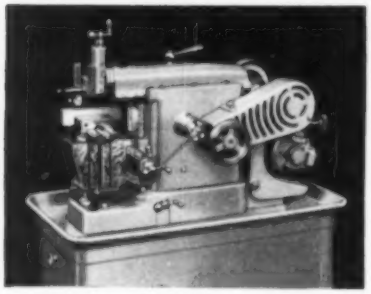
Shop Equipment News

NEW PRODUCTS — PUBLICATIONS

NEW 7-IN. PRECISION BENCH SHAPER

A new 7-in. bench shaper has been announced by the South Bend Lathe Works, South Bend, Ind. It is capable of the most exacting work on parts within its capacity.

Main castings for the shaper are made of close-grained semisteel. The ram and table slides are milled and hand-scraped for precision fit and are provided with adjustable gibs. The bull gear shaft and countershaft revolve in Oilite bearings. All gears are machine cut from steel or gear fiber for smooth, quiet operation. Backlash is held to a minimum by fitting parts to extremely close tolerances.



New South Bend 7-in. shaper

The ram of this shaper is 18 in. long and has ample bearing rigidity in all positions. Length of the ram stroke is 0 to 7 in. A large handwheel aids in making the adjustment. Cutting speed is variable from 3 to 114 ft. per minute. Stroke rates of 42, 75, 120, and 195 per minute are obtained by shifting a V belt on 4-step cone pulleys.

The tool head has a 3-in. feed, swivels to any angle, and has a positive lock. The tool post provided takes tools with shanks ⅜ by ⅞ in.

The worktable is 5 7/16 by 5 by 6 in. deep. It is slotted on top and sides, and has holes for attaching the vise and special work clamps in various positions. Reversible power cross feeds for the table range from .002 to .016 in. per ram stroke. A graduated plate indicates the feed. Horizontal table travel is 9½ in., vertical travel is 5 in., and maximum distance from table to ram is 5½ in. The vise has a graduated base and swivels to any angle. Vise jaws are 4 in. wide, 1 in. deep, and open to 4 in.

A 1/3 h.p., 1725 r.p.m. motor is required for power and is mounted on a cradle attached to the back of the shaper. For further information, specifications, and prices, write to the South Bend Lathe Works, 178 East Madison St., South Bend 22, Ind.

For brief reference use IAVE—0501.

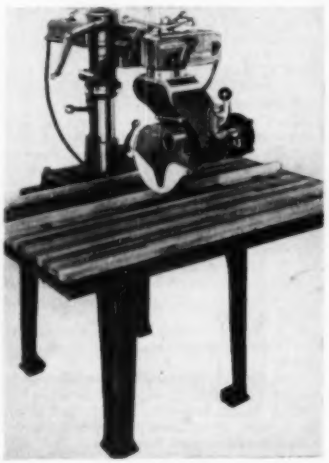
NEW WALKER-TURNER RADIAL SAW

The new 900 series radial saw has just been placed in production by the Walker-Turner Division, Kearney & Trecker Corporation, Plainfield, N. J.

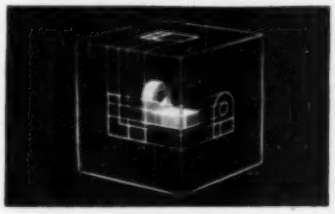
Some of the many features that make cutting easier and faster on wood, plastic, and similar materials, follow:

New Center-Pivot Offset yoke permits all cuts to be made in the convenient table area.

(Continued on page 34A)



New Walker-Turner radial saw



VISUALIZE MECHANICAL DRAWING FOR YOUR STUDENTS . . .

Those fundamentals of Mechanical Drawing which give young learners so much difficulty at first, can be made easier to grasp with the assistance of McGraw-Hill's Text-Films on Mechanical Drawing in your classroom presentation. Complete and accurate visualization of shape description, sections, auxiliary views, and dimensioning practices brings new meaning to class discussions and demonstrations. Teachers report increased retention of material when these films are used, as well as a direct carry-over of desirable techniques to the students' own drawings.

These eight motion pictures and seven follow-up filmstrips, correlated with French and Svensen's *Mechanical Drawing*, represent the best co-operative efforts of educational people and motion picture producers. Subject areas were selected and scripts were checked by mechanical drawing teachers; three-dimensional photography of special models and vivid animation sequences were the contribution of the film experts. The result is a new classroom technique – designed specifically to help teacher and student alike in accomplishing their learning objectives.

For complete information, write for Booklet MD2.

Titles of the Films

1. The Language of Drawing
2. Shape Description Part I
3. Shape Description Part II
4. Sections
5. Shop Procedures
6. Auxiliary Views Part I
7. Auxiliary Views Part II
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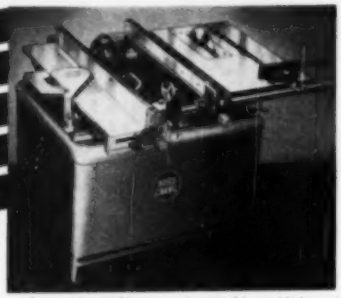
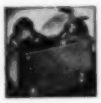
IT CUTS—MITRES—PLANES—RABBETS AND GROOVES



THE BOICE-CRANE SAW-JOINTER

Compactly combines, on a portable welded steel cabinet stand, a 10" tilting arbor saw and a 6" jointer, driven by one, rather than two motors. (Imitators only tilt their tables—not the blade.) A unique drive permits mounting the motor rigidly and separate from the machine. Both machines can be used simultaneously. The longer table and fence guarantees perfect work on longer stock than usually handled on 6" jointers. The jointer planes or rabbets ½" deep. The saw cuts stock up to 3" thick, and rips up to 21" wide with standard bars for fence (or to 37" wide with No. 2537 bars, at slight extra cost.) A hinged door is provided for cleaning out the saw dust and shavings which are collected in the stand.

BOICE-CRANE FRICTION-MATIC WET TOOL GRINDER



Now students can sharpen hand tools without danger of damage to tools or personal injury. Simplified self-adjusting friction roll drive. Peripheral speed remains constant as wheel wears. No water thrown on operator. Permits proper pressure control. Operator takes a comfortable standing position and works on top of the wheel. Large tool rest, the first with adequate adjustment.

BOICE-CRANE POWER TOOLS

- Designed for ready adaptability to a wide range of projects, fewer machines are needed to fill all your requirements.
- As nearly 100% safe as modern devices permit.
- Of just the right size for school shops, they permit more efficient shop layouts than larger equipment.
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First correctly made milled-to-pattern shaper cutters at moderate prices. Real production-type two-wing cutters with the advantages of costlier CIRCULAR or INVOLUTE* relief. This new principle machines the shape into the cutter on an arc that assures clean cutting without burning. Safer than knives. Cut the same true original shape and dimensions, right up to the last sharpening. Larger rake, or cutting angle, shears or shaves doesn't scrape. Up to 50% more usable life. Adequate initial clearance angle for higher spindle speeds, which never changes when properly sharpened. Result — faster cutting, more production, cleaner cuts. More metal behind cutting edge, reduces chipping, crumbling, under heavy cuts; dissipates heat faster on high speed shaping. Fine, tungsten tool steel. Deep hardened and oil tempered. Precision formed. Razor sharp. Authentic, full-sized commercial shapes. Average 3¼" diameter for higher peripheral speed. Designed for the rugged Boice-Crane shaper, but improves performance of all other makes.

Write for Bulletin S-1 on Shaper Cutters which illustrates and describes 50 different cutters and cutter sets.

*Also called flattened-arc relief; cam-profiled relief

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Please send free literature on Boice-Crane's
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☐ Bulletin on Tru-Form Relief Cutters for Shapers
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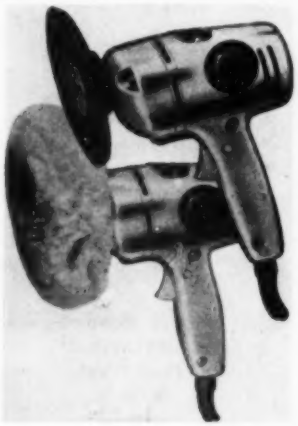
Literature with complete details and accessories listing with prices is available on request.

For brief reference use IAVE—0502.

A NEW 5-IN. SANDER-POLISHER

A new home-utility 5-in. sander-polisher has been added by the Black & Decker Mfg. Co., Towson 4, Md., to their expanding home-utility line of portable electric tools. This new tool has many uses in the home, school, or hobby shop, and on the farm.

Its standard equipment consists of 3 sanding disks, a lamb's wool bonnet, a 7-oz. can of home-utility electric wax, and a 5-in. molded rubber pad. This makes either a portable sander or a polisher out of this new tool.



Black and Decker 5-in. sander-polisher

A disk sanding table attachment allows the tool to sand difficult bevels and ends of wood, plastic, or any other material that is also available. The attachment also includes the table, and a miter-gauge calibrated for 15-, 30-, 45-, 60-, and 90-deg. angles.

Then sander-polisher can be converted into a ¼-in. drill by threading a ¼-in. Jacobs Hex Key Chuck into the spindle. A ¼-in. bench stand can be used to convert the sander-polisher into a drill press.

The tool is driven by a powerful universal motor for use with 110 volts a.c., or d.c. current. The no load spindle speed is 3000 r.p.m. The tool has an instant release trigger switch that can be locked *on* if desired, and a 3-wire rubber-covered cable with plug.

For further information write to the manufacturer.

For brief reference use IAVE—0303.

(Continued on page 36A)

SHOP EQUIPMENT NEWS

(Continued from page 32A)

The 9-in. blade gives it a 3⅛-in. capacity.

The new geared motor runs very cool and has 2½ times overload capacity.

It has a 24-in. cross-cut travel.

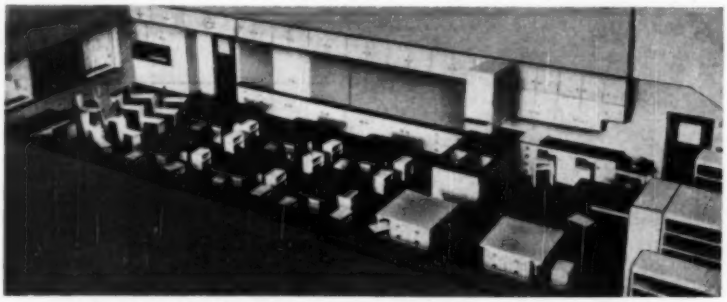
It rips to the center of a 48-in. panel.

It possesses full work visibility.

It has rigid, clean-cut accuracy; holding design incorporates taper latch indexing and locks that are easy to reach and operate.

It is equipped with a large table of laminated hard maple 46 by 24 in.

It is available for immediate delivery in RA901 1½ h.p. single phase, and RA902 1½ h.p. three phase models.



Model of the Sheldon ideal school art room. See article on page 36A

Classroom drafting tables!

LET US KNOW *Your* REQUIREMENTS

Having been enthusiastically approved by industry, Seco 4-post tables are now being offered in classroom size.

Drawers and drawing board storage space are provided in interchangeable units as optional equipment.

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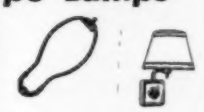

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A unique reference containing working drawings, with concise explanations, of the design, construction and use of 1000 pieces of tooling equipment and tooling procedures.

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Lathe Operations, $1.75; Milling Machine Operations, $1.75; Shaper Operations, $1.00. *Preparing:* Bench, Grinder Operations. Clear directions, with all necessary technical data. Many illustrations.

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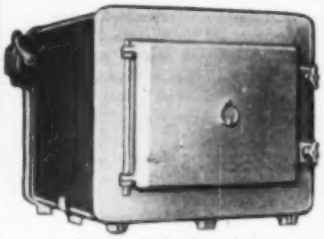
We manufacture many types and sizes of electric kilns. All Weldon kilns are strongly made, the result of years of actual use. Fronts, doors, and backs, cast metals. RIBBON ELEMENTS: built for continuous use. • Tell us the type of pottery you make and we will help you select the proper type and temperature kiln. Art pottery is made at less than 2000° F. Stoneware and porcelain may be made at less than 2200° F.



15 x 12 x 18 Bench Model

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Size Inside Baking Chamber Wide	High	Long	Prices F. O. B. Harrison 2315	2200° F. Cone 6	2000° F. Cone 04
9 x	8 x	18	Bench Type	$180.00	$160.00
9 x	10 x	14	Bench Type	220.00	190.00
9 x	10 x	18	Bench Type	240.00	210.00
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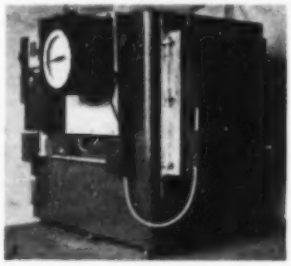
9 x	12 x	18	Bench Type	280.00	250.00
15 x	12 x	18	Bench Type	350.00	300.00
15 x	15 x	24	Bench Type	425.00	375.00
15 x	18 x	24	Bench Type	475.00	425.00
18 x	24 x	36	Cabinet	890.00	790.00



Floor Model with Electronic indicating, controlling, recording instrument.

JAMES W. WELDON, Laboratory
2315 Harrison Street
Kansas City 8, Missouri

MENTION INDUSTRIAL ARTS WHEN WRITING.

SHOP EQUIPMENT NEWS

(Continued from page 34A)

PLANNING STUDIO-WORKSHOPS IN ART

After studying the needs of an efficient art room, E. H. Sheldon & Company, Muskegon, Mich., have designed a studio which possesses the specific features of plan and equipment shown in the illustration. See illustration on page 34A.

Basic to the planning of the room was the assumption that a vital art program involves the use of a number of art mediums. The studio-workshop, therefore, has been conceived in terms of a series of work centers in which activities using different kinds of materials can be carried forward. Thus, one area has been developed primarily for work with two-dimensional materials, i.e., painting, drawing, poster work, and like activities; another area is the center for clay activities; still another for light woodworking; and another for metalwork. The philosophy of a diversified program is embodied in a plan such as that shown.

Adequate storage space is one of the difficult problems in any art education project. There must be provision for the permanent equipment needed in carrying on activities such as drawing boards, looms, leatherworking tools, and art objects. In addition, space is needed for expendable materials such as papers, paints, yarns, and clay. Finally, there must be space for the keeping of current students' work. Provision for all of these types of storage is found in the plan for the studio-workshop.

For more specific information on planning an art studio, write to E. H. Sheldon & Co., Muskegon, Mich.

For brief reference use IAVE—0504.

NEW LUFKIN CHROME CLAD MICROMETERS

The Lufkin Rule Co., Saginaw, Mich., has just announced that all Lufkin micrometers will hereafter have a *chrome clad* satin finish. This finish possesses a nonglare quality which makes reading easier in bright or poor light. Markings stand out sharp and bold against the satin finish which is also highly rust and wear resistant.

New Lufkin chrome clad micrometer

To ensure a high degree of measuring accuracy the anvil and spindle ends have a micro-lapped, mirror-like finish. The one piece spindle has hardened and ground threads assuring smooth action and long life. This micrometer has a cutaway frame, which makes it easy to get into hard-to-get-at places. Each thousandth graduation on the thimble is numbered, which makes for rapid reading, and the instrument can be adjusted easily. The chrome clad frames also carry a decimal equivalent table.

For brief reference use IAVE—0505.

BRODHEAD-GARRETT COMPANY ANNOUNCES NEW SALESMEN

Brodhead-Garrett Co., 4560 E. 71st St., Cleveland 5, Ohio, announces the placement of two new men in the selling field February 1.

Kenneth G. Eckley will be covering the state of Indiana and the southern part of Illinois.

Charles H. Clawson will be covering the states of Missouri, Oklahoma, and Kansas.

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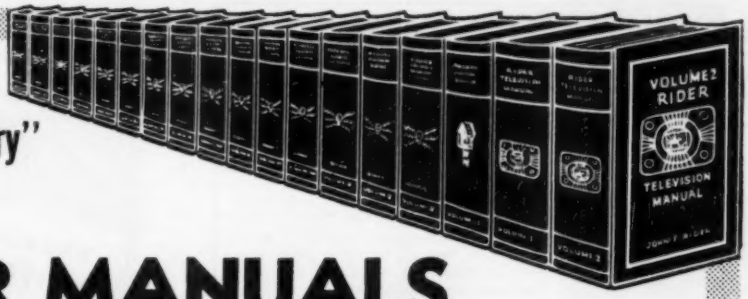

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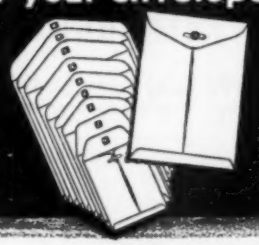

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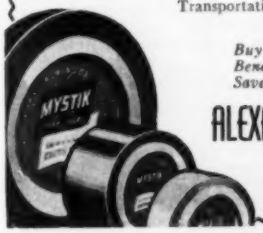

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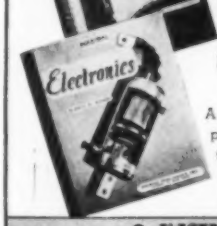

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NEWS NOTES

(Continued from page 31A)

While these charts were sold originally, they are now available to any school for just the transportation charges (shipped express collect).

♦ Educator's Progress Service, Randolph, Wis., have reprinted John Guy Fowlkes' "Through Films for Cultural and Industrial Strength," which had previously appeared in "Educators Guide to Free Films."

The pamphlet also lists some case examples of free films, among them: Airplanes, Romance of Mahogany, Heritage of Victory, American Miracle, There's More to Timber Than Trees, Tomorrow's Leaders, and The Forest Ranger.

♦ On March 16, 1949, the New York University Chapter of the American Society of Mechanical Engineers, sponsored a talk by Paul Wrablica, a New York industrial designer and consultant.

Mr. Wrablica, an executive member of the American Designers' Institute, and a design instructor at Pratt Institute, Brooklyn, N. Y., pointed out how mechanical engineering and industrial design join forces in industry. Slide films, compiled by the American Designers' Institute, graphically illustrated the talk. The program was held at Lawrence House, Bronx, N. Y.

Similar talks have been given by Mr. Wrablica at Yale University, the Norwich Art School, and other New England colleges.

♦ The third annual National Industrial Arts Awards Fair will be held at the Chicago Museum of Science and Industry from August 21 through October 15. Entries should be shipped directly to the Museum, but not before May 20 nor later than June 20.

The Scholastic Industrial Arts Awards Fair presents an opportunity to exhibit the best work of students from all sections of the United States, and in various areas of study.

There are six divisions in which students may enter work this year — the wood division, drawing division, metal division, machine shop, plastics, and radio electronics.

For further information on rules, write to George H. Fern, director, Scholastic Industrial Arts Awards, 7 East 12th St., New York 3, N. Y.

♦ The U. S. Civil Service Commission, Washington, D. C., announces an examination for teachers on the level of elementary, secondary, and vocational school, salary to be $2,498 to $3,351 a year; also for teacher-adviser, $2,724 and $2,927 a year, for duty in the Bureau of Indian Affairs, Department of the Interior. This closes all examination announcements issued by U. S. Civil Service Regional Offices for similar positions. Persons who have attained eligibility under a regional office announcement need not apply for this new examination. Applications should be sent to the U. S. Civil Service Regional Office having jurisdiction over the area in which the applicant wishes to work. Persons who wish to receive early consideration should have their applications on file not later than April 26, 1949.

♦ Members of the several instructional departments of the New York State Agricultural and Technical Institutes and the New York State Institutes of Applied Arts and Sciences have been meeting together during the past year with a view toward analyzing, developing, and improving curriculums. The following persons are chairmen of the curriculum workshops as indicated: E. H. Hamilton, State Agricultural and Technical Institute, Morrisville, administration; William Long, State Agricultural and Technical Institute, Canton, agriculture; B. K. Sommers, State Agricultural and Technical Institute, Delhi, building technology; Raymond Keller, State Institute of Applied Arts and Sciences, New York City, chemical technology; Harold DesNoyers, State Institute of Applied Arts and Sciences, White Plains, electrical technology; Grace Hunt, State Institute of Applied Arts and Sciences, Buffalo, food technology; Walter Rauch, State Institute of Applied

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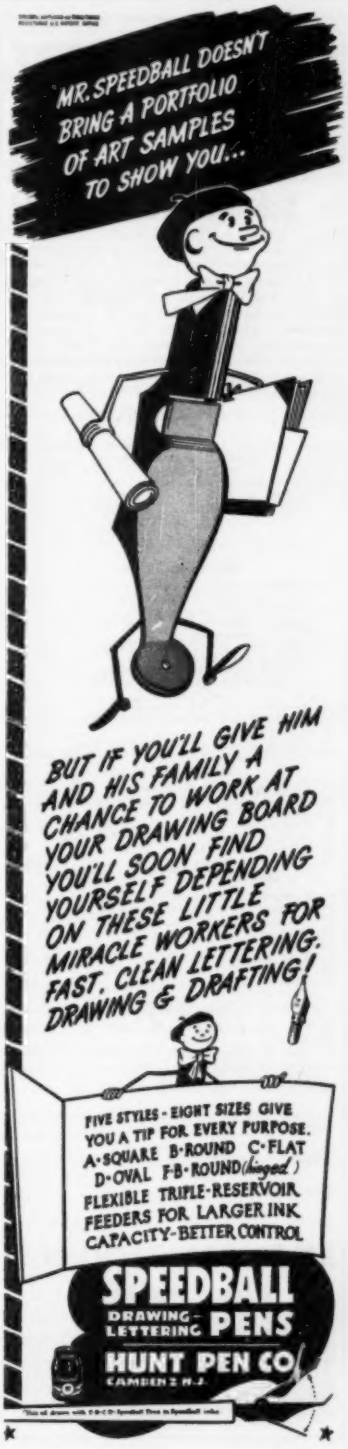
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NEWS NOTES

(Continued from previous page)

Arts and Sciences, Buffalo, mechanical technology; Stephen Warde, State Institute of Agriculture and Home Economics, Cobleskill, science and mathematics; Charles Holdorf, State Institute of Agriculture and Home Economics, Cobleskill, physical education.

The chairman of each workshop will report the results of the committees at the Annual Institute Conference to be held during the summer of 1949.

♦ Research fellowships amounting to $18,460 have been awarded by the General Electric Company under its Education Fund to 15 graduate students for advanced study.

Seven of the students received Charles A. Coffin Fellowships for advanced study in electricity, physics, and the physical sciences.

Eight other students were awarded Gerard Swope Fellowships for advanced study in industrial management, engineering, the physical sciences, and various scientific and industrial fields.

The fellowships are awarded annually on a competitive basis to graduates of universities, colleges, and technical schools who have shown through previous work that they could undertake or continue advanced study either in this country or abroad.

Winners of the awards may receive up to $1,500, plus a grant for any special equipment needed in their chosen field of research. Loans also may be available to the students during their period of study. Funds for both the Coffin and Swope Fellowships come from the income derived from the $1,000,000 G-E Education Fund.

Four of this year's winners will receive awards to continue study already begun under the Coffin and Swope Fellowships. They are Robert A. Crane, Los Angeles, Calif.; Robert W. Davison, Glens Falls, N. Y.; and Edward S. Mason, Washington, D. C. All three men received earlier grants under the Charles A. Coffin Fellowships. James E. Zimmerman, Philip, S. Dak., is studying on an earlier grant of a Gerard Swope Fellowship.

Other students receiving Charles A. Coffin Fellowships are: Albert A. Bartlett, Hamilton, N. Y.; Preston R. Clement, Kansas City, Mo.; Joseph G. Gurley, Arlington, Va.; and Frank Stern, New York City.

Other graduates receiving Gerard Swope awards are Charles C. Allen, Worcester, Mass.; Curt A. Levis, Cleveland Heights, Ohio; Vernon H. Neubert, Cabot, Pa.; Leonard R. Sayles, Rochester, N. Y.; Ralph E. Scruby, Longmont, Colo.; F. Morgan Warzel, Walnut, Kans.; and Wayne F. Wright, Schenectady, N. Y.

The committee selecting the award winners represented leading engineering and scientific organizations in the country, including the American Society of Mechanical Engineers, American Society of Engineering Education, American Chemical Society, American Institute of Electrical Engineers, American Physical Society, and the National Academy of Sciences. Representatives of the General Electric Company also served on the committee.

♦ A study made recently by the National Safety Council was based on official reports in Nassau County, N. Y., and the state of Kansas. These two areas are the only ones in the United States which collect detailed information on accidental deaths in the home.

The location and percentage of accidental deaths in the home are as follows: basement, 1.7 per cent; bathroom, 3.5 per cent; bedroom, 25.6 per cent; dining room, 3.4 per cent; garage, 1.1 per cent; inside stairs, 7.4 per cent; kitchen, 10.3 per cent; living room, 5.9 per cent; porch, 3.3 per cent; yard, 11.6 per cent; outside stairs, 3.9 per cent.

According to this study the bedroom leads in fatal home accidents. Babies and aged persons are the most frequent victims.

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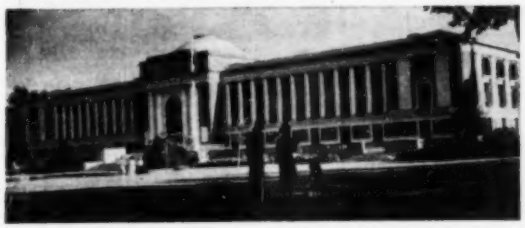

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By Blanche Romick Pope. Cloth, 303 pp., 6⅞ by 9¼ in., illus., $3.75. Manual Arts Press, Peoria, Ill.

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The book discusses the construction and upholstery of box furniture, how edge rolls and pads are made, the different kinds of springs and how to do spring work, cushions with and without inner springs, reconditioning furniture, how to make slip covers and protectors, how to arrange furniture, and the making of window drapes.

Aviation Mechanics Aircraft Manual

By John W. Vale, Jr. Cloth, 748 pp., 5¾ by 8¼ in., illus., $6. McGraw-Hill Book Co., New York, N. Y.

A book designed for those who are preparing for the mechanic's rating issued by the C.A.A.

It contains about 2000 questions which will be found very helpful when preparing for the examination.

It covers those subjects that are most needed by the ground mechanic, such as: flight and characteristics of the airplane; stability and design; metals used in airplane construction; welding and fusion of metals; woods and glues; fabrics, covering, and finishing; plastics and rubbers; landing gears and devices; brakes; the electrical, hydraulic, and fuel systems, parachutes and safety devices; wires and cables; control systems; assembling and rigging; and inspection and maintenance.

There are four appendices which give an overview of aviation history, definitions and problems, AN parts, and useful tables.

Architectural Drafting

By William J. Hornung. Cloth, 154 pp., 8⅝ by 11¼ in., illus., $3.40. Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y.

A practical text for students of vocational and technical schools. Rightly so, this book starts out with construction principles, so the student can develop a sound basis for the work of making house plans later on.

Then follow chapters on the making of house plans, the heating of the home, the plumbing that is required and how it is installed, and finally, the wiring of the house for electrical lighting and the many electrical appliances that are now found in the homes.

The book also contains a full set of model house plans with specifications.

A glossary of terms also is appended.

Machining of Metal

By Robert E. Smith. Cloth, 224 pp., 8 by 10½ in., illus., $3.50. McKnight & McKnight, Bloomington, Ill.

This is a revised edition of an excellent text on the machines that are used by the machinist and toolmaker.

It is quite significant that the author starts out his work with a chapter on safety.

Other chapters are devoted to the lathe, shaper, milling machine, power hack saw, metal cutting band saws, and grinders. There also is a chapter on measuring and measuring instruments, and one on the tool grinder and its operation.

Mathematics for Electricians

By Martin H. Kuehn. Cloth, 372 pp., 5¾ by 8⅛ in., illus., $2.80. The McGraw-Hill Book Co., New York, N. Y.

This is the third revised edition of this text, which with its broader appeal may now be more serviceable to a greater number of students.

The book contains a review of the fundamentals of arithmetic, then introduces simple algebra, the

(Continued on page 44A)

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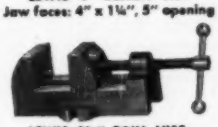

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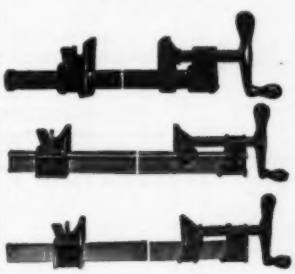

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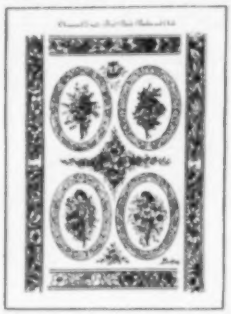

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equation, Ohm's law, series circuits, problems on work and power, electrical power, square root, factoring, slide rule, percentages, parallel circuits, generator and motor problems, Kirchoff's laws, logarithms, alternating-current problems, vectors and three-phase circuits.

The appendix contains tables on the wire gauges, natural trigonometric functions, power factors, logarithms, and answers to the problems.

Beauty Culture — Its Science and Practice

By Josephine Cherioli. Cloth, 305 pp., 6⅞ by 9¾ in., illus., $3. The Bruce Publishing Co., 540 No. Milwaukee St., Milwaukee 1, Wis.

The author of this book has had 17 years' experience as a teacher on a circuit for the Wisconsin school of vocational and adult education. Her book furnishes in one handy volume all that is necessary to provide well-trained personnel in the field of beauty culture. The book is written for the average person in easily understood terms. Part 1 of the book treats of hygiene, safety, bacteriology, sanitation, anatomy and physiology, elementary chemistry, and electrology. Part 2 presents lessons on the hair and scalp, haircutting, waving and curling, and hair coloring. Part 3 explains how to care for the skin, how to apply facial make-up, remove superfluous hair, and care of hands, arms, and feet. Part 4 takes up shop management. The appendix treats of first-aid procedures and a comprehensive glossary also is furnished.

Rural Electrification

By J. P. Schaenzer. Cloth, 338 pp., 6¼ by 9¼ in., illus., $3.76. The Bruce Publishing Company, 540 North Milwaukee St., Milwaukee 1, Wis.

This is the fourth edition of this text which was specially prepared for agricultural colleges, vocational schools, farm owners, and those who have to do with the furnishing of electricity in the rural areas of our country.

The material in the book is explained in simple and understandable language, and it is well illustrated with line drawings and half tones.

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By Willis G. Brown, Assistant Specialist for Aviation, Office of Education. 5 pp., free, list available from Office of Education, Federal Security Agency, Washington 25, D. C.

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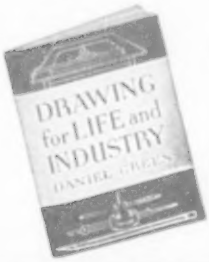

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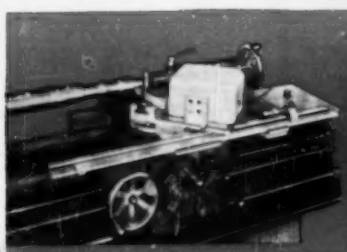

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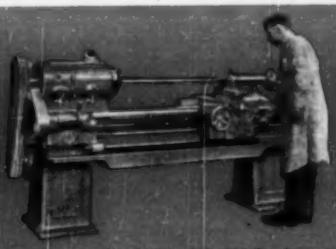

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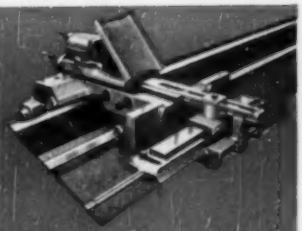

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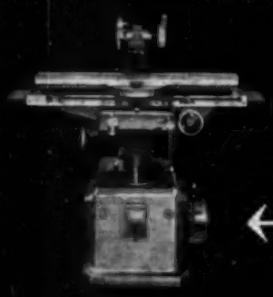

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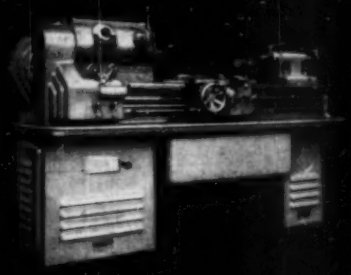

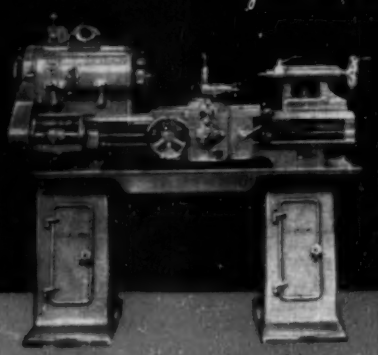

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